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(54) **RACE MONITOR**

ÜBERWACHUNGSVORRICHTUNG FÜR RENNEN

APPAREIL DE SURVEILLANCE DE COURSE

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(56) References cited:
EP-A- 0 409 568
EP-A- 0 432 801
DE-A- 3 929 048
US-A- 4 823 367

- **PATENT ABSTRACTS OF JAPAN vol. 14, no. 485 (C-0772) 23 October 1990 & JP-A-22 00 280**
- **PATENT ABSTRACTS OF JAPAN vol. 9, no. 62 (P-342) 16 March 1985 & JP-A-59 196 493**
- **PATENT ABSTRACTS OF JAPAN vol. 9, no. 30 (P-333) 1 October 1984 & JP-A-59 173 787**

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Description

This invention relates to a race monitor. While the device of the present invention was specifically designed for running races, i.e. marathons, it will be appreciated that the device can be used to monitor other races such as biathlons, duathlons, triathlons, bicycle races and cross country ski races.

The usual practice in races of the type described above is to issue a uniquely numbered, paper bib to each participant prior to a race. In a biathlon or triathlon, the number is also written on the legs or arms of each participant, because they may not be wearing bibs at all times during a race. The problem with such a system is that in races involving a large number of participants and many timing stations spaced apart along the path of the race, a large number of officials is required to monitor the race. Moreover, communications between the various stations and a central point (usually the start/finish line) can also be a problem. Accordingly, it is difficult for race officials and announcers to keep track of the progress of the participants, i.e. to provide a comprehensive overview of the race.

JP-A-2 200 280 discloses a race monitor, wherein each participant carries an active sender/receiver emitting continuously an ID Code.

The object of the present invention is to provide a solution to the above problems by providing a relatively simple race monitor which does not rely on a large number of race officials, and which can provide more or less simultaneous progress data as race participants pass through stations located in the path of the race.

Accordingly, the present invention relates to a race monitor for use in multi-contestant races comprising inert transponder means carryied by each contestant, each said transponder means having a unique identification code; a plurality of scanner means emitting an interrogation signal mounted on a plurality of aligned individual contestant gates for causing said transponder means to emit its identification code; reader means connected to each said scanner means for receiving said code; and first computer means including clock means for receiving and storing information concerning race times from said reader means.

The invention will be described in greater detail with reference to the accompanying drawings, which illustrate a preferred embodiment of the invention, and wherein:

Figure 1 is a schematic, perspective view of a race monitor in accordance with the present invention; and

Figure 2 is a schematic, block diagram of a complete race monitor system in accordance with the present invention.

Referring to the drawings, the basic elements of the invention include a transponder 1, which is carried by an athlete, a scanner 2 for mounting at a monitoring or timing station (not shown), a reader 3 attached to each scanner 2 and a computer 4 for receiving a signal from the reader 3.

The transponder 1 is a small device containing its own unique identification number. The transponder is an inert device which is activated by a radio signal, which causes the transponder to respond with its own identifying number, which number is also assigned to a contestant. A suitable transponder is the 9/16" TX1104 transponder available from Destron/IDI Inc. of Boulder, Colorado, U.S.A. which has a range of 34 billion unique identification combination. Each athlete in a race wears a wrist watch or band containing a transponder 1.

The transponder 1 is read by a scanner 2 when the transponder is placed in contact with a fiberglass, disc-shaped target 6 (Fig.1) containing the scanner. The scanner 2 emits a low power 400 kHz interrogation signal which energizes an access card (not shown) in the transponder 1. A signal from the transponder card is filtered and amplified by the scanner 2 and transmitted to the reader 3. Suitable scanners and readers are also available from Destron/IDI Inc. The reader 3 receives the improved signal from the scanner 2 and digitizes such signal, interprets the data and performs tests on the data to ensure the validity thereof.

A pair of targets 6 are mounted on a single monitor box 8 (Fig.2). A plurality of such boxes 8 are mounted on a row of frames or ports (not shown) to define gates similar to those formed by supermarket checkout counters. Preferably the gates are 30 to 36 inches wide, permitting the passage of only one athlete at a time. The targets 6 are mounted at an angle of about 20° on one side of each gate, and at a height of approximately three feet from the ground. An athlete passing either side of the box 8 will have access to a target 6. Each target 6 also carries a light 9, which provides a visible signal that the scanner 2 has read the transponder 1 of the athlete passing through the gate. A post 10 extending upwardly form the box 8 carries a sponsor's sign 11 containing lights 12 (Fig. 1). A horn or tweeter 13 or another noise maker is mounted in each end of the sign 12 for providing an audible signal that an athlete has passed through the gate and his/her transponder identification has been read. The box 8 contains a pair of readers 3, computers 4, printers 14 and a radio 15 for transmitting data to remote central results and/or announcer radios 17 and 18 (Fig. 1), respectively. The radios 15, 17 and 18 are off-the-shelf two-way RF frequency devices. Acceptable data communication equipment is available from Data Radio Inc., Town of Mount Royal, Quebec, the equipment including models BDLC, BDL5-S5, Dataradio T-Modem 96, Dataradio 4800 SRM, 9600 SRM Radio Modem, MDLC modem data link and Dataradio S-1, S-5 Series 4800 and 9600 model.

The radio 17 is connected to a central results computer 20, which is connected to a central results printer 21. The radio 18 is connected to an announcer's com-

puter 23, which is connected to an announcer's printer 24. Thus, each time the transponder of an athlete is read by the scanner 2, the location and time of the athlete are virtually instantaneously available.

It will be appreciated that the apparatus described herein can be used for foot or running races, biathlons, duathlons, triathlons and cross country ski races. Before the start of a race, each entrant is issued a unique bib number for identification purposes. The number, typically on a paper bib is attached to the athlete's clothing. In a biathlon or triathlon, the number is also written on the arms or legs of the participants, because they may not be wearing their bibs at all times during a race. This identification system is standard for all races and would continue to be used in conjunction with the apparatus of the present invention.

Each athlete in a race carries a wrist strap containing a transponder 1. The transponder 1 can be built into a wristwatch, can be mounted in a wristwatch-like housing, or can be otherwise attached to an athlete. In any event, a transponder 1 is provided for each athlete. Immediately prior to the race, a computer file is built equating the athlete's transponder number to the race number. Such a computer file can be created prior to race day. The timing stations equipped with boxes 8 can be used for race check-in procedures, in which case the race monitoring stations are located so that each entrant must pass through a gate to enter the staging area where the race starts. The length of the race, type of event and number of entrants will dictate the number of stations required, so that there is little or no congestion. Because it does not matter which gate the athlete passes through, the athletes will naturally enter gates which are not in use. The use of a large target such as a disc carrying the scanner 2 makes it easy for an athlete to quickly locate the scanner prior to each race. If necessary, as the athletes approach timing stations, race officials instruct them to touch the transponder 1 in the center of the target 6 as they pass through a chute.

When a transponder 1 touches a scanner 2, the identification number of the transponder is sent from the scanner to the reader 3 and thence to the computer 4. While the computer 4 is preferably a personal computer, it could be replaced by a device capable of reading the identification numbers from the reader and matching the number to an internal clock, storing the data, and transmitting the data to a computer. The computer 4 reads the identification number received from the reader, reads its own clock which is the elapsed time from the start of the race, creates a file of identification numbers and times and causes printing of the numbers and times for backup purposes. Simultaneously, a signal is emitted to illuminate the lights 9 and 12, and to activate the tweeter 13. The identification number and time records from each timing station can be instantly relayed by the radios 15, 17 and 18 to central computers 20 and 23 (which may be one device) for announcing and television identification.

A combination of individual chutes or gates and lights/horns or tweeters immediately indicate whether a successful read has occurred. If a contestant does not contact the scanner 2 or if there is an equipment failure, both the timing crew and the athlete are immediately aware of the problem.

It will be appreciated that in its simplest form the monitor includes the transponder 1, the scanner 2, the reader 3 and a computer 4 for receiving and storing data. The other elements of the invention are indented to provide visual and audible indications of whether each transponder is being read, and to provide instantaneous information to others concerning the times and locations of contestants.

Claims

1. A race monitor for use in multi-contestant races comprising inert transponder means (1) carried by each contestant, each said transponder means having a unique identification code; a plurality of scanner means (2) emitting an interrogation signal mounted on a plurality of aligned individual contestant gates for causing said transponder means to emit its identification code; reader means (3) connected to each said scanner means for receiving said code; and first computer means (4) including clock means for receiving and storing information concerning race times from said reader means.

2. A race monitor according to Claim 1, including light means (9) connected to said first computer means for providing a visual indication that the identification code of a transponder means has been read by said reader means.

3. A race monitor according to Claim 2, including sound producing means (13) connected to said first computer means for providing an audible indication that the identification code of a transponder means has been read by said reader means.

4. A race monitor according to Claim 1, including first printer means (14) connected to said first computer means (4) for printing information from said first computer means.

5. A race monitor according to Claim 1, including radio means (15) connected to said first computer means (4) for transmitting information concerning a race; second central computer means (20) for receiving information from a plurality of said first computer means and providing an overview of a race.

Patentansprüche

1. Renn-Monitor zur Anwendung in Rennen zwischen mehreren Läufern, der aus einer inerten Transponder-Vorrichtung (1) besteht, die jeder Läufer mit sich führt, wobei die genannte Transponder-Vorrichtung einen eindeutigen Identifikations-Code enthält; mehrere Scanner-Vorrichtungen (2), die ein Abfragesignal aussenden und an mehreren ausgerichteten individuellen Zieltoren angebracht werden, an denen verursacht wird, daß die genannte Transponder-Vorrichtung ihren Identifikations-Code sendet; an jede genannte Scanner-Vorrichtung angeschlossene Lesevorrichtung (3) zum Empfang des genannten Codes; und eine erste Computer-Vorrichtung (4) einschließlich einer Uhrzeit-Vorrichtung für Empfang und Speicherung von Laufzeit-Informationen von der genannten Lesevorrichtung.

2. Renn-Monitor nach Anspruch 1, dadurch gekennzeichnet, daß Lichtmittel (9) an die genannte ersten Computer-Vorrichtung angeschlossen sind, um visuell darzustellen, daß der Identifikations-Code einer Transponder-Vorrichtung von der genannten Lesevorrichtung gelesen worden ist.

3. Renn-Monitor nach Anspruch 2, einschließlich einer and die genannte erste Computer-Vorrichtung angeschlossenen Tongeber-Vorrichtung (13) zur Ausgabe einer hörbaren Meldung, daß der Identifikations-Code einer Transponder-Vorrichtung von der genannten Lesevorrichtung gelesen worden ist.

4. Renn-Monitor nach Anspruch 1, einschließlich einer mit der genannten ersten Computer-Vorrichtung verbundenen ersten Drucker-Vorrichtung (14) zum Ausdrucken der Informationen von dcr genannten ersten Computer-Vorrichtung.

5. Renn-Monitor nach Anspruch 1, einschließlich einer an die genannte erste Computer-Vorrichtung (4) angeschlossenen Funk-Vorrichtung (15) zum Senden der Informationen über ein Rennen; zweite zentrale Computer-Vorrichtung (20) zum Empfang von Informationen von mehreren genannten ersten Computer-Vorrichtungen und zur Darstellung eines Überblicks über das Rennen.

Revendications

1. Système de contrôle de course destiné aux courses à plusieurs concurrents, composé de transpondeurs inertes (1) portés par chaque concurrent, chacun desdits transpondeurs possédant son propre code d'identification, des interrogateurs (2) émettant un signal d'interrogation, montés sur barrières admettant les concurrents un à un et déclenchant l'émission des codes d'identification des transpondeurs, des lecteurs (3) reliés à chaque interrogateur précité recevant le code susmentionné et un premier calculateur (4) comportant une horloge, recevant et stockant l'information concernant les temps des coureurs provenant des lecteurs précités.

2. Système de contrôle de course conforme à la revendication 1 comportant des voyants lumineux (9) reliés au premier calculateur précité, servant à indiquer visuellement que le code d'identification d'un transpondeur a été lu par le lecteur précité.

3. Système de contrôle de course conforme à la revendication 2 comprenant un ou plusieurs générateurs sonores (13) reliés au premier calculateur précité, servant à indiquer de façon audible que le code d'identification d'un transpondeur a été lu par le lecteur précité.

4. Système de contrôle de course conforme à la revendication 1, comprenant une première imprimante (14) reliée au premier calculateur précité, servant à imprimer l'information provenant dudit premier calculateur.

5. Système de contrôle de course conforme à la revendication 1, comprenant un émetteur-récepteur radio (15) relié au premier calculateur précité (14), servant à transmettre l'information relative à une course, second calculateur central (20) servant à recevoir l'information provenant de plusieurs premiers calculateurs et donnant une vue d'ensemble de la course.

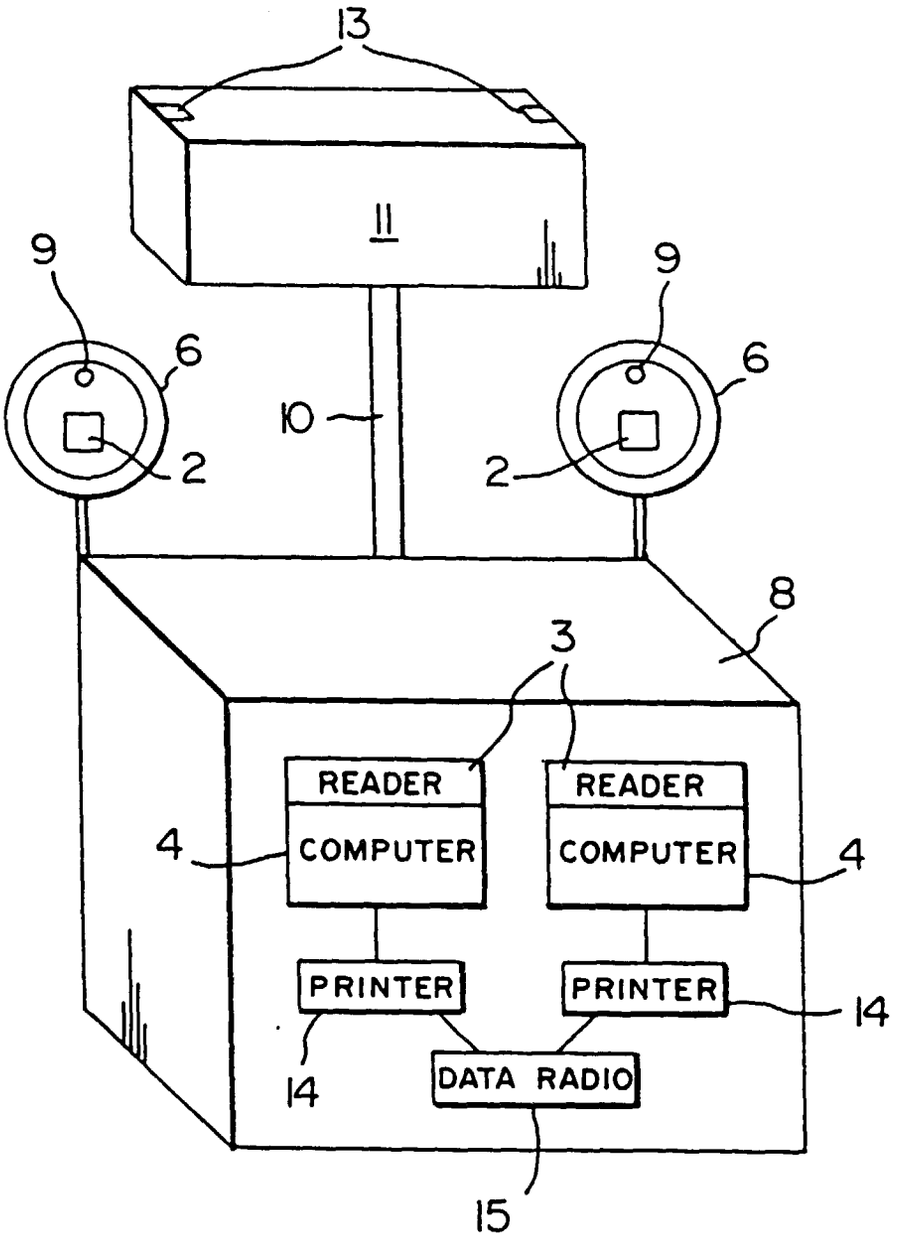

13
11
9
9
6
6
10
2
2
8
3
READER
COMPUTER
READER
COMPUTER
4
4
PRINTER
PRINTER
14
14
DATA RADIO
15

FIG. 1

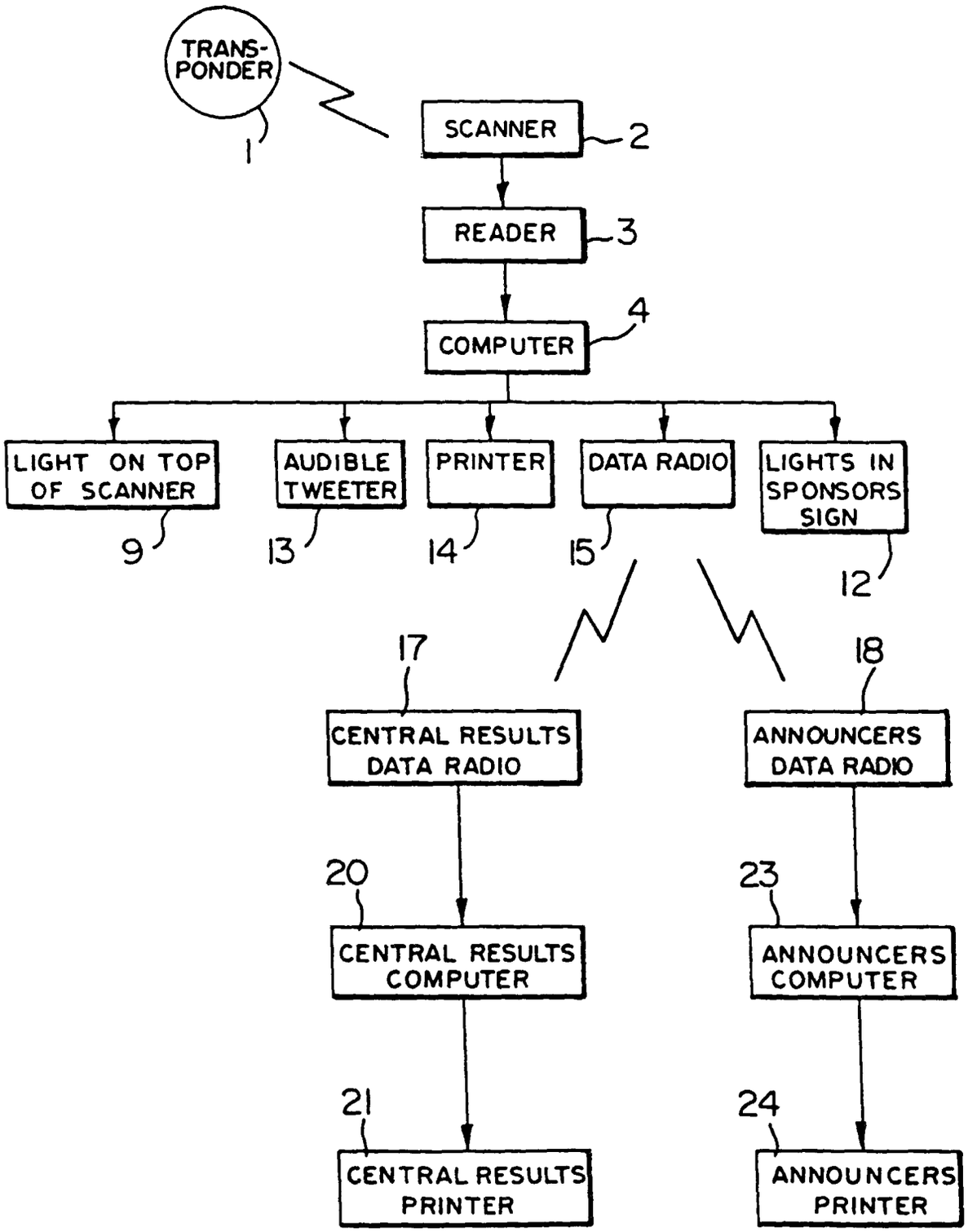

TRANS-PONDER
1
SCANNER
2
READER
3
COMPUTER
4
LIGHT ON TOP OF SCANNER
9
AUDIBLE TWEETER
13
PRINTER
14
DATA RADIO
15
LIGHTS IN SPONSORS SIGN
12
17
CENTRAL RESULTS DATA RADIO
18
ANNOUNCERS DATA RADIO
20
CENTRAL RESULTS COMPUTER
23
ANNOUNCERS COMPUTER
21
CENTRAL RESULTS PRINTER
24
ANNOUNCERS PRINTER

FIG. 2