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(54) **Fitness equipment for training foot bones and muscles**

(57) A fitness equipment for training foot's bones and muscles having a plurality of permanent magnets (22) in cooperation with electromagnets (12) corresponding to the permanent magnets for creating an expected elec-

tromagnetism. Therefore, the foot plate (20) can move up and down with the electromagnetism for achieving the expected foot protection effect. Meanwhile, the operation of the electromagnets (12) is controlled by a preset program in a microprocessor (40) and relevant controllers.

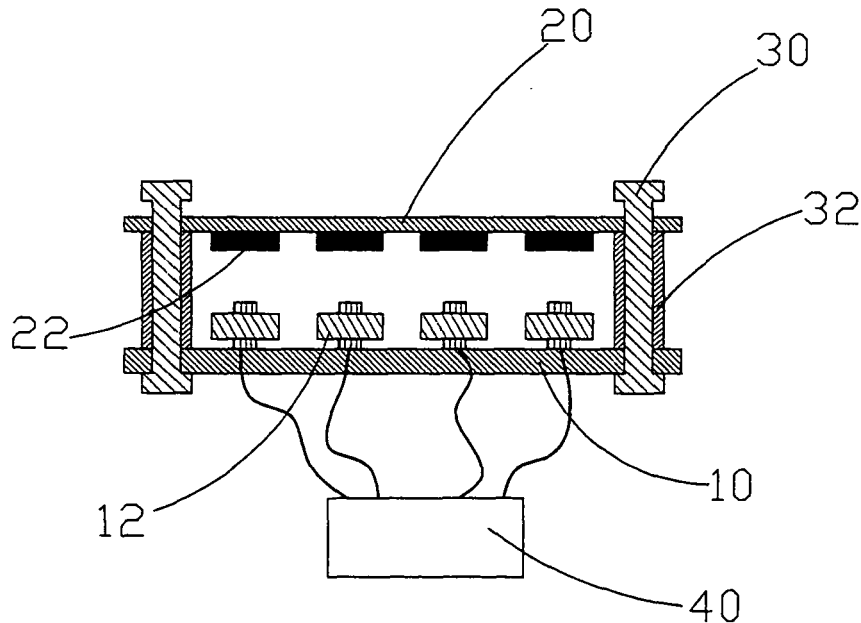


FIG. 2

**Description**

## BACKGROUND OF THE INVENTION

## 1. Fields of the Invention

**[0001]** The invention relates to a fitness equipment for training foot's bones and muscles, and particularly to an equipment that is silently driven by the interaction of electromagnets and permanent magnets.

## 2. Description of the Related Art

**[0002]** When the modern people reach a certain age stage, they have to face some necessary physiological conditions like weakening of muscle strength and loss of the bone substance. These conditions are dependent on age, personal physical factors, life style, regular exercise, etc. This is the so-called aging process. In addition to following the medication instructions given by the doctors, taking regular exercise and changing dietary habit and contents, anyone who faces this aging condition has to own an indoor exercise apparatus for keeping his or her physical fitness as well as for training his or her bones and muscle strength.

**[0003]** As stated above, some people with special occupations like astronauts, divers, or other researchers and testing professionals have more serious problems with the degeneration of muscle strength and the loss of bone substance since their working environment has zero or slighter gravitation. Accordingly, they urgently need special apparatuses for speeding up the recovery of their original physical fitness and health. It is a pity that such apparatuses are still not available on the market. Therefore, those who have the above-mentioned physical symptoms or urgently need the protection against them will feel discouraged and find that their existence carries no weight.

## SUMMARY OF THE INVENTION

**[0004]** A primary object of the invention is to provide a special fitness equipment for training foot's bones and muscles without the disadvantages of the state of the art.

**[0005]** A further object of the invention is to provide a special fitness equipment making no noise or only a little bit from exercise for training foot's bones and muscles.

**[0006]** The above objects are achieved with a special fitness equipment with the features of claim 1.

**[0007]** According to the invention non-contact magnetic components are used for the purpose of equivalent drive performance and a plurality of permanent magnets corresponding to electromagnets are employed to create electromagnetism. A foot plate can move up and down with the created electromagnetism, thereby achieving the expected foot protection effect.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** The accomplishment of this and other objects of the invention will become apparent from the following description and its accompanying drawings of which:

FIG. 1 is a perspective view illustrating a preferred embodiment of the invention;

FIG. 2 is a cutaway view of the embodiment according to FIG. 1;

FIG. 3 is a perspective view illustrating the operation of the embodiment of the invention; and

FIG. 4 is a perspective view illustrating another embodiment of the invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0009]** Now, the present invention will be described more specifically with reference to the following embodiments. It is to be noted that the following descriptions of preferred embodiments of the invention are presented herein for purpose of illustration and description only; it is not intended to be exhaustive or to be limited to the precise form disclosed.

**[0010]** First, with reference to FIGS. 1 and 2 illustrating a preferred embodiment of the invention, the invention includes a bottom plate 10, a foot plate 20, and a plurality of positioning pins 30. By use of the positioning pins 30, a proper gap between the bottom plate 10 and the foot plate 20 is created. A plurality of electromagnets 12 is disposed on the top of the bottom plate 10. Meanwhile, the bottom side of the foot plate 20 is fitted with a plurality of permanent magnets 22 corresponding to the electromagnets 12. In cooperation with a microprocessor 40, the electromagnets 12 will create in unit time expected magnetism like attraction or repulsion relative to the permanent magnets 22. In this way, the foot plate 20 is forced to move up and down.

**[0011]** As shown in FIG. 3, the foot plate 20 moves up and down when the electromagnets 12 and the permanent magnets 22 attract or repel each other. By use of the effect created many times in unit time, those who stand on the foot plate 20 get natural reflex action on the foot muscles and bones. In other words, the natural reflex action will be created as one goes uphill or downhill, thereby achieving the expected effect of the sport health. Especially, the user can make use of a microprocessor control panel 54 on a handle frame 52 of an equipment 50 to control the exercise speed and duration by himself. Therefore, the demand of the users can be completely fulfilled.

**[0012]** Indeed, in order to damp sudden and rapid up-and-down motion of the foot plate 20 as well as to reduce the reactive force, a flexible collar 32 can be wrapped around each positioning pin 30 in such a way that the flexible collar 32 is interposed between the bottom plate 10 and the foot plate 20. As shown in FIG. 4, an elastic

element 34 is alternatively positioned between the top of the positioning pin 30 and the foot plate 20 for ensuring an optimal cushioning effect.

**[0013]** The built-in program preset in the microcomputer 40 is not in the scope of patent examination. Therefore, unnecessary details are not given hereinafter. 5

**[0014]** Alternatively, the installation position of the electromagnets 12 and the permanent magnets 22 according to the invention can be exchanged in such a way that the electromagnetic effect remains unchanged. 10

**[0015]** While the invention has been described in terms of what is presently considered to be the most practical and preferred embodiments, it is to be understood that the invention needs not be limited to the disclosed embodiment. On the contrary, it is intended to cover various modifications and similar arrangements included within the spirit and scope of the appended claims which are to be accorded with the broadest interpretation so as to encompass all such modifications and similar structures. 15  
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## Claims

1. A fitness equipment for training foot's bones and muscles, comprising a bottom plate (10), a foot plate (20), and a plurality of positioning pins (30) in such a way that a proper gap between the bottom plate (10) and the foot plate (20) is created, wherein a plurality of electromagnets (12) is disposed on the top of the bottom plate (10), and the bottom side of the foot plate (20) is fitted with a plurality of permanent magnets (22) corresponding to the electromagnets (12), and in cooperation with a microprocessor (40), the electromagnets (12) will create in unit time expected magnetism relative to the permanent magnets (22) such that the foot plate (20) is forced to move up and down. 25  
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2. The fitness equipment for training foot's bones and muscles of claim 1 wherein a flexible collar (32) can be wrapped around each positioning pin (30) in such a way that the flexible collar (32) is interposed between the bottom plate (10) and the foot plate (20). 40
3. The fitness equipment for training foot's bones and muscles of claim 1 wherein an elastic element (34) is alternatively positioned between the top of the positioning pin (30) and the foot plate (20). 45

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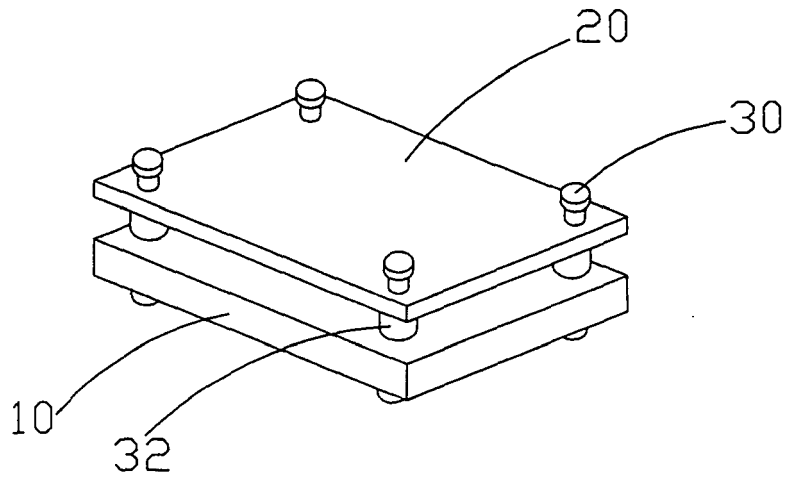


FIG.1

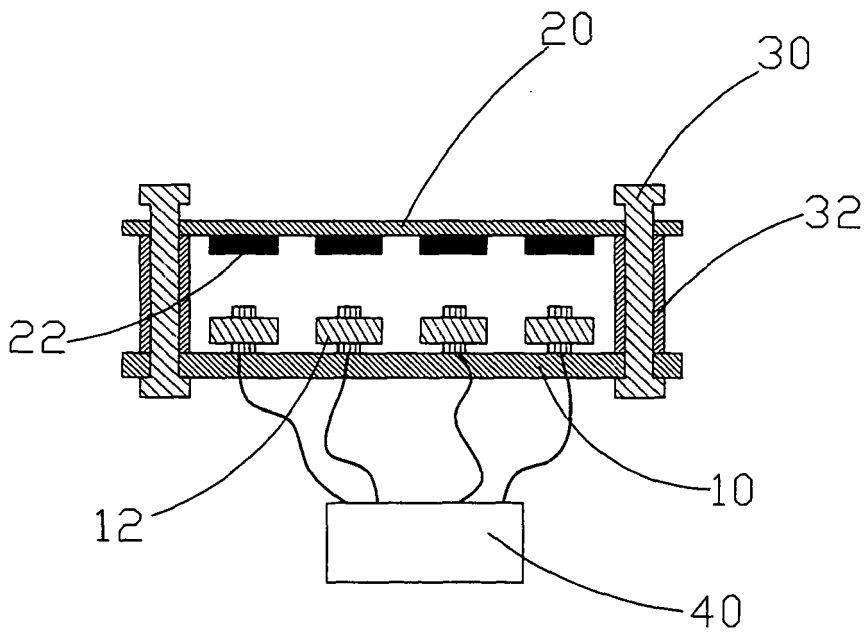


FIG.2

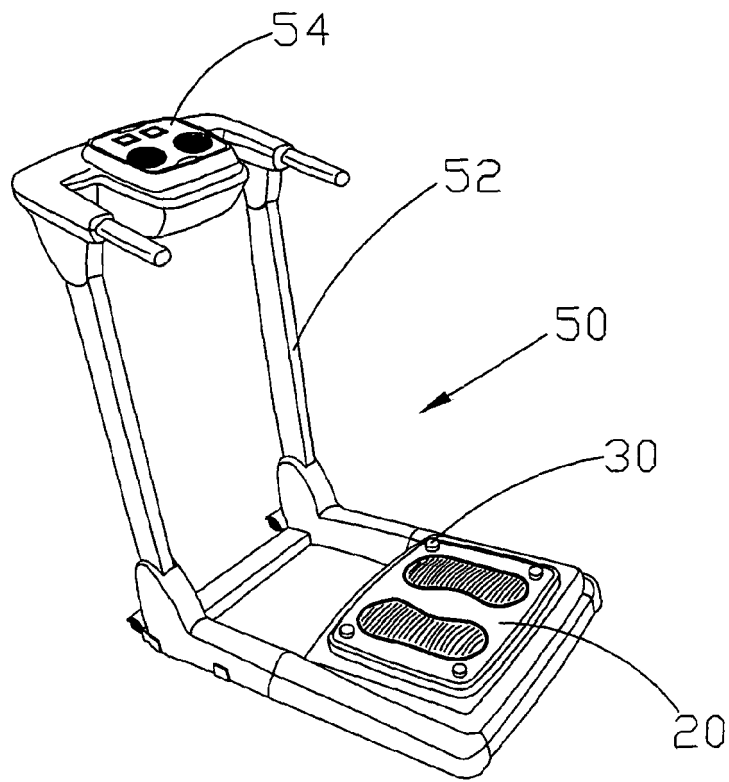


FIG. 3

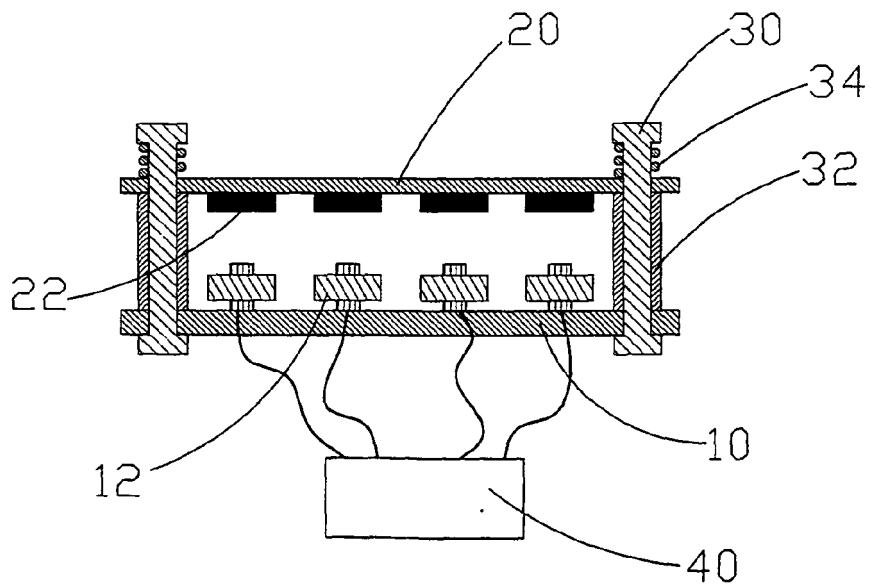


FIG. 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 273 028 A (MCLEOD KENNETH J [US] ET AL) 28 December 1993 (1993-12-28) * column 4, line 35 - column 13, line 20; figures 1-9 *	1-3	INV. A61H1/00 A61H23/02
X	----- US 2006/094990 A1 (KIM SEONG B [KR] KIM SEONG BAE [KR]) 4 May 2006 (2006-05-04) * paragraph [0044] - paragraph [0083]; figures 3A-6 *	1-3	
X	----- WO 2006/001656 A (KIM BANG BEA [KR]) 5 January 2006 (2006-01-05) * page 11, line 11 - page 20, line 27; figure 1 *	1-3	
X	----- US 4 858 598 A (HALPERN ALAN A [US]) 22 August 1989 (1989-08-22) * column 5, line 34 - column 17, line 42; figures 3-13 *	1-3	
E	----- WO 2006/096734 A1 (JUVENT INC [US]; TALISH ROGER J [US]) 14 September 2006 (2006-09-14) * the whole document *	1-3	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) A61H
Place of search The Hague		Date of completion of the search 5 February 2007	Examiner Oelschläger, Holger
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone                      Y : particularly relevant if combined with another document of the same category                      A : technological background                      O : non-written disclosure                      P : intermediate document</p> <p>T : theory or principle underlying the invention                      E : earlier patent document, but published on, or after the filing date                      D : document cited in the application                      L : document cited for other reasons                      .....                      &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.92 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 01 8542

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-02-2007

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82