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Liu et al.(10) **Patent No.:** **US 8,251,878 B2**
(45) **Date of Patent:** **Aug. 28, 2012**(54) **DUMBBELL HAVING ADJUSTABLE
INERTIAL RESISTANCE LOAD
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U.S.C. 154(b) by 258 days.(21) Appl. No.: **12/667,041**(22) PCT Filed: **Dec. 4, 2009**(86) PCT No.: **PCT/CN2009/075311**

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482/91, 81, 82, 57

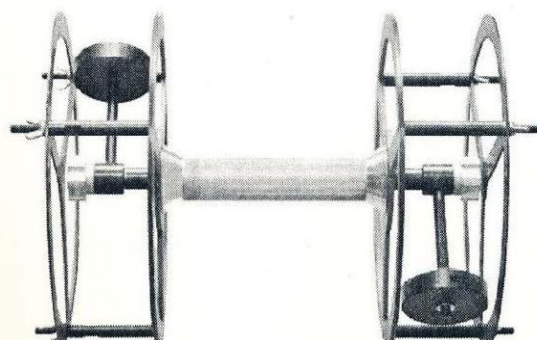
See application file for complete search history.

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Gu(57) **ABSTRACT**

A dumbbell having adjustable inertial resistance load in the field of athletic sports devices is disclosed. The structure of the present invention is characterized in that the hand grip of the dumbbell is provided inside with a rotatable main shaft, the two swing hammer rods and the swing hammers at both ends of the main shaft constitute a normal pendulum, and the two pendulums at both ends of the main shaft are connected through the main shaft, so as to be functionally combined into the function of one eccentric pendulum. The main shaft, the two swing hammer shafts and the swing hammers constitute an eccentric pendulum. The two pendulums fixed at both ends of the main shaft may be adjusted at different angles. In case the angle between the two pendulums is zero degree, upon the rotation of the pendulums, the forces between the hand grip and the hand, besides the mutual force in the up-and-down direction, also include the periodic inertial force in the fore-and-aft direction. In case the angle between the two pendulums is non-zero degree, upon the rotation of the pendulums, the forces also include the periodic inertial force in the left-and-right direction. By adjusting the weight of the swing hammer, the distance from the swing hammer to the main shaft and the included angle of the two swing hammer rods, the amplitude of the inertial force may be adjusted. This inertial force is a resistance load, and functionally speaking, the dumbbell of the present invention has the characteristic of adjustable inertial resistance load.

6 Claims, 5 Drawing Sheets

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Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

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1

DUMBBELL HAVING ADJUSTABLE INERTIAL RESISTANCE LOAD CHARACTERISTIC

FIELD OF THE INVENTION

The present invention relates to the field of athletic sports devices, in particular to an improved dumbbell, the function of which is for enhancing the arm power of one's arm and in the meanwhile training the coordination capability of the whole body muscle.

BACKGROUND OF THE INVENTION

The health consciousness of people nowadays is increasingly improving, they are fond of various fitness sports, and however, many sports are limited by time and space. The sport of dumbbell lifting is one very convenient sport which is beneficial for the health of one's body, as the volume of the dumbbell is small, no excessively large space is necessarily occupied by the user upon lifting the dumbbell, and the sport of dumbbell lifting is not limited by time and space.

The sport of dumbbell lifting is such that the arm of the user upon holding the dumbbell accomplishes the acts of bending and extending of the arm or other general actions, through which the power of the muscle may be trained. However, the sport of dumbbell lifting also has its shortcomings, that is, the sport of dumbbell lifting is mainly for the training of power, while the training on the neuromuscular coordination is insufficient.

The object of the present invention is to add the function of training on the muscular coordination while maintaining the characteristic of the sport of dumbbell lifting that the muscular power is trained under no time or space restriction.

SUMMARY OF THE INVENTION

The present invention aims at providing an inertial dumbbell, which, besides maintaining the training function of existing dumbbells, adds two new functions to the sport of dumbbell lifting by structural improvement: (1) The new structure requires that, upon dumbbell lifting, besides the conventional requirement of power, the action of lifting can only be accomplished by meeting the additional requirement that the power and period for lifting the dumbbell are appropriate, thus the neuromuscular coordination upon dumbbell lifting may be trained. (2) During the process of dumbbell lifting, an additional periodic vibration is generated on the arm and body by the dumbbell, which makes not only the power of arm but also the whole body muscle being trained.

The structure of the present invention is characterized in that the dumbbell is provided inside with a rotatable eccentric pendulum, and upon the user lifting the dumbbell up and down, only when the exerted are appropriate can the eccentric pendulum rotate. The power and strength applied upon lifting the dumbbell without the present structure are not limited, thus the requirement on the neuromuscular coordination during movement is not strong. However, upon lifting the dumbbell of the present invention, requirements are imposed on both the period and the strength of the power exerted. After rotation of the eccentric pendulum within the dumbbell, periodic inertial force is generated, which causes an additional periodic vibration of the arm and the whole body of the user. To be adapted to such a periodic vibration, the whole body muscle is placed under periodic muscular tension, which also provides some training effects for the power of the whole body muscle. This inertial force is a resistance load.

2

The structure of the present invention is mainly composed of the following parts:

1. Hand grip: or referred to as the dumbbell holding rod, which has a hollow structure interiorly, bearings are mounted within both ends of the hollow tube, and a rotatable main shaft penetrates therein. One protecting disc is fixed at each of both ends of the hand grip.
 2. Main shaft: the main shaft penetrates through the interior of the hand grip, and is free to rotate, each of both ends of the main shaft is fixed with a swing hammer shaft, and the swing hammer shafts at both ends may be fixed at mutually parallel positions with respect to each other, and also may be adjusted to be fixed at the positions that form a certain angle with respect to each other.
 3. Swing hammer shaft: one end of the swing hammer shaft is fixed on the main shaft by a detachable screw, one or a plurality of swing hammers having a certain weight may be fixed on the swing hammer shaft, the distance from the swing hammer to the main shaft may be arbitrarily adjusted, and scales are provided on the swing hammer shaft indicating the distance from the center of the main shaft. By adjusting the position of the swing hammer on the swing hammer shaft and the number of the swing hammers, the moment of inertial of the pendulum rotating around the hand grip may be adjusted. The swing hammer and the swing hammer shaft should be mutually well fixed, since the centrifugal force of the swing hammer upon the rotation of the pendulum causes the tendency of the swing hammer sliding outwardly along the swing hammer shaft. To avoid the case in which when the swing hammer and the swing hammer shaft are not mutually securely fixed, upon the rotation of the pendulum, the swing hammer may slide and fall off the swing hammer shaft, the other end of the swing hammer shaft is provided with a device for preventing the falling off of the swing hammer.
 4. Swing hammer: the swing hammer may be conveniently fixed at different positions on the swing hammer shaft, and the swing hammer is marked thereon with the mass of the swing hammer.
 5. Protecting disc: two protecting discs are respectively fixed at both ends of the hand grip, three upright posts are fixed on the periphery of the protecting disc at an equal interval of 120 degrees, and the dumbbell sheet may be arbitrarily added to the three upright posts so as to adjust the weight of the dumbbell. The protecting disc and the three upright posts thereon together with the dumbbell sheet for adjusting the weight of the dumbbell constitute one cylindrical chamber, within which the pendulum may rotate, thus it is ensured that the arm may not collide and scrape against the rotating pendulum, so the function of protecting the arm is provided.
 6. Dumbbell sheet: three circular holes are provided on the periphery of the dumbbell sheet at an equal interval of 120 degrees for the mating fixation with the three upright posts on the protecting disc. The number of the dumbbell sheets fixed on the three upright posts may be arbitrarily added, but at least one dumbbell sheet is fixed thereon.
- Two swing hammer rods and a plurality of swing hammers constitute two normal pendulums, which are respectively at both ends of the main shaft. The two pendulums at both ends of the main shaft are connected through the main shaft, so as to be functionally combined into the function of one pendulum, and the movement of this combined pendulum has its own characteristic, which we call an eccentric pendulum. The main shaft, the two swing hammer shafts, and the plurality of swing hammers constitute the eccentric pendulum.