United States Patent [19]

Bender

[11] **3,785,647**

[45] **Jan. 15, 1974**

[54] **BALANCING DEVICE**

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[22] Filed: **Oct. 6, 1971**

[21] Appl. No.: **187,105**

[52] **U.S. Cl.** ..... **273/1 M,** 273/1 R, 273/DIG. 2, 273/DIG. 19

[51] **Int. Cl.** **A63f 9/00**

[58] **Field of Search** ..... 273/1 R, 1 M; 272/1 D; 46/51

[56] **References Cited**

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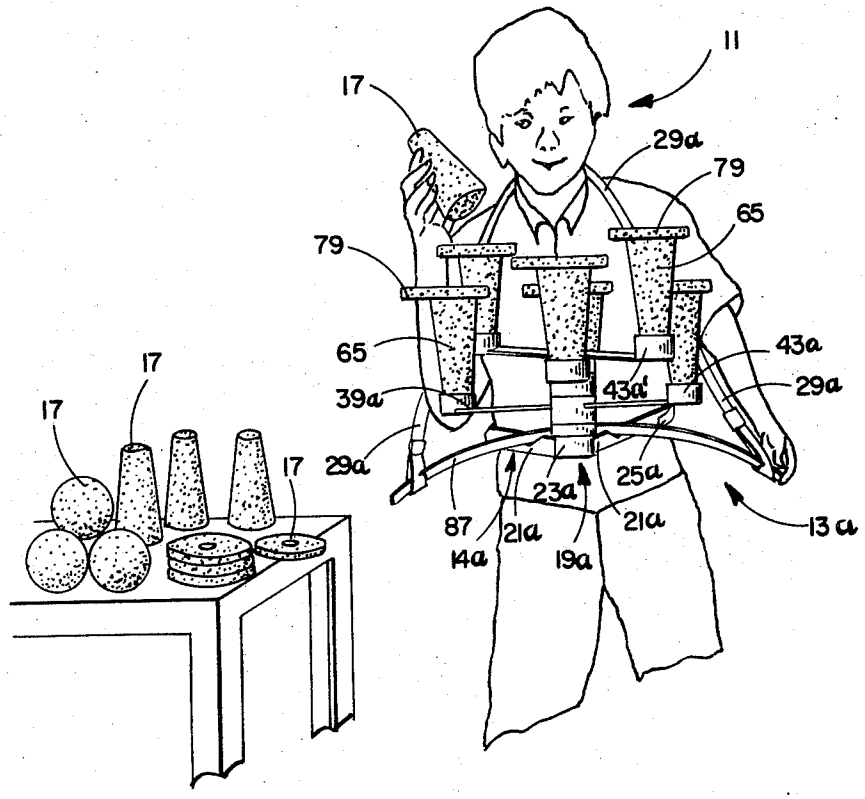
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[57] **ABSTRACT**

A device utilized for balancing objects thereon which comprises a support structure in the form of a body rack having attachment means such as a waist strap for detachably securing the body rack to the body of the user so that his arms can be free for placement of objects. A plurality of transversely extending arms can be carried on the body rack, the arms having support areas or receptacles for balancing objects thereon at spaced locations such as at the ends of the arms. The arms may be rotatably mounted on the body rack, and a drive motor may be provided for causing the arms to slowly rotate in a horizontal plane to increase the difficulty of balancing the objects on the arms.

14 Claims, 11 Drawing Figures

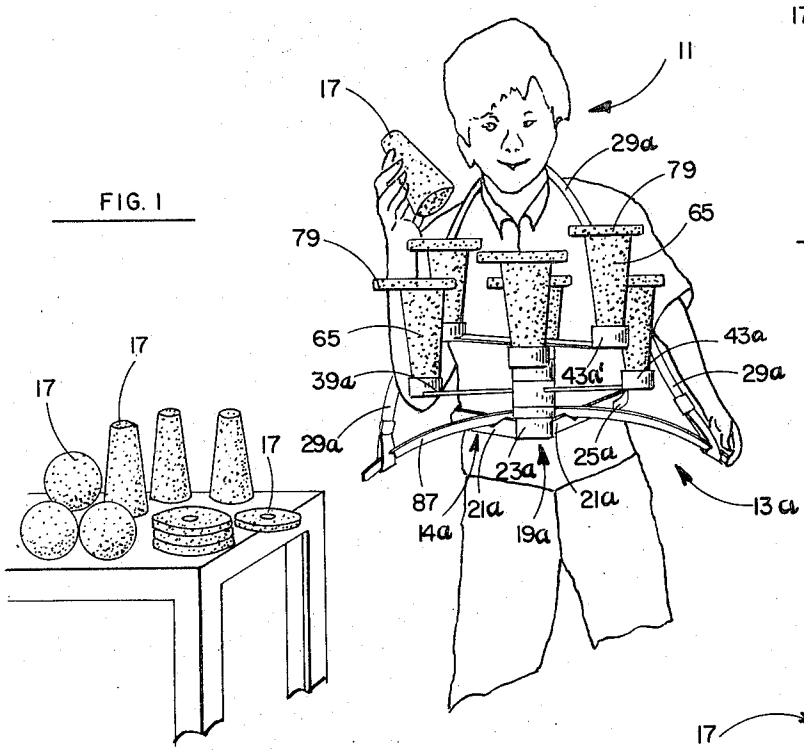


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SHEET 1 OF 2

FIG. 1



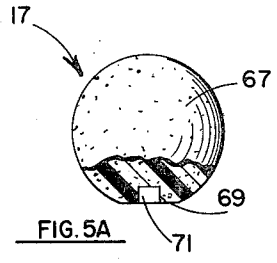


FIG. 5A

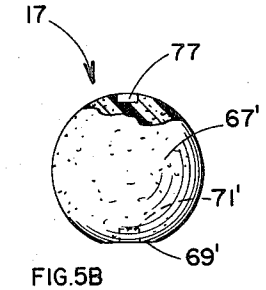


FIG. 5B

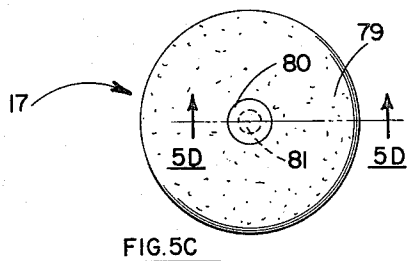


FIG. 5C

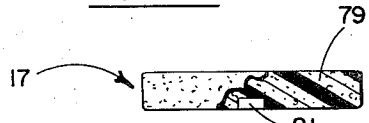


FIG. 5D

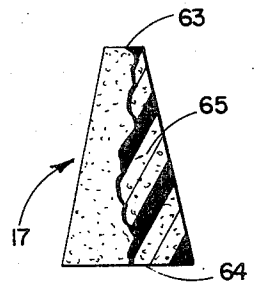


FIG. 5E

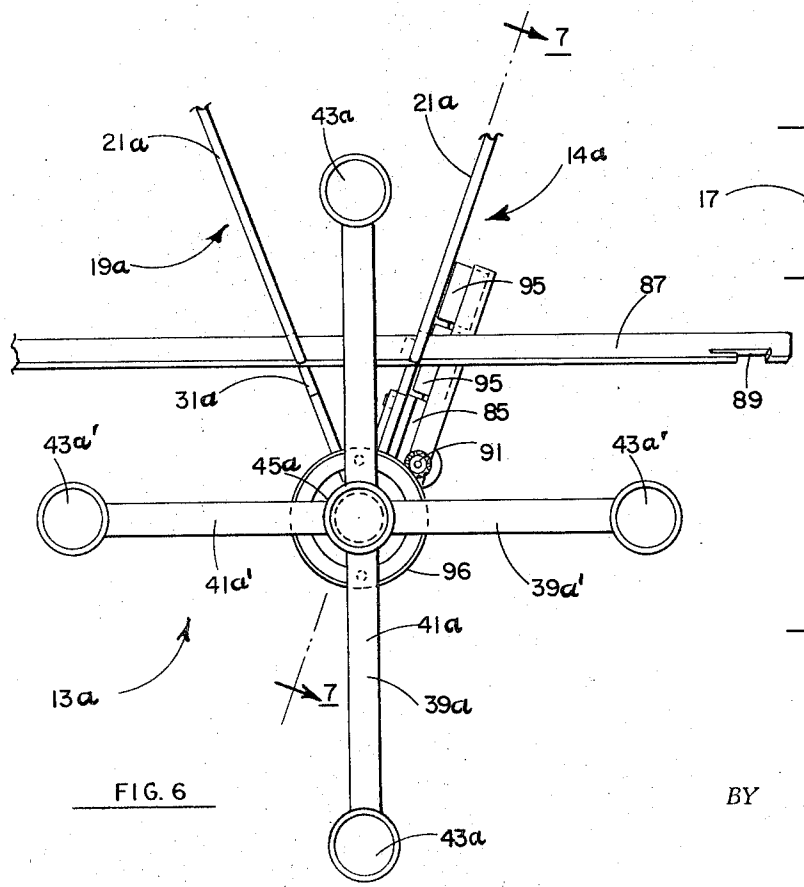


FIG. 6

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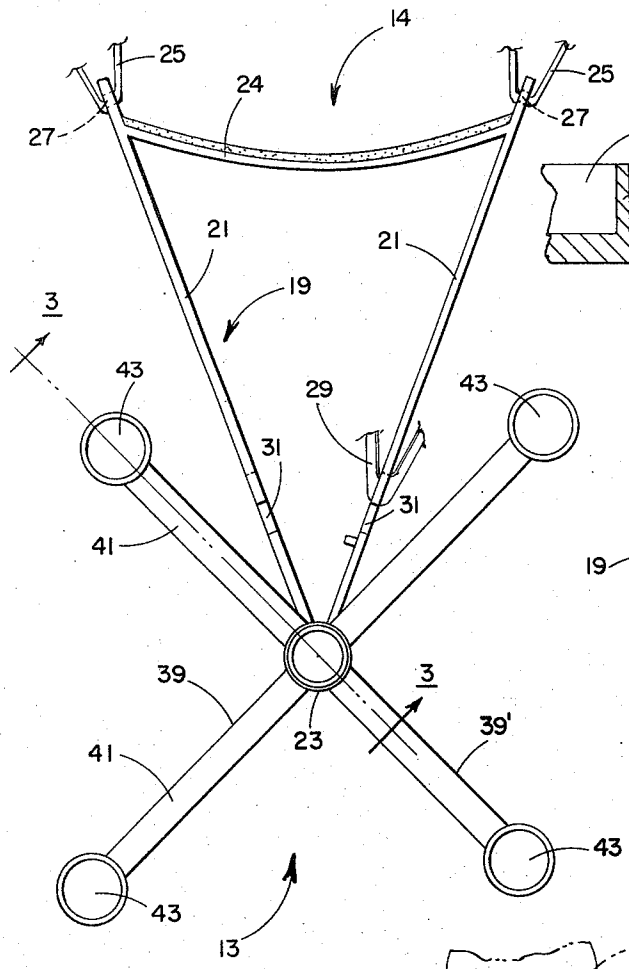


FIG. 2

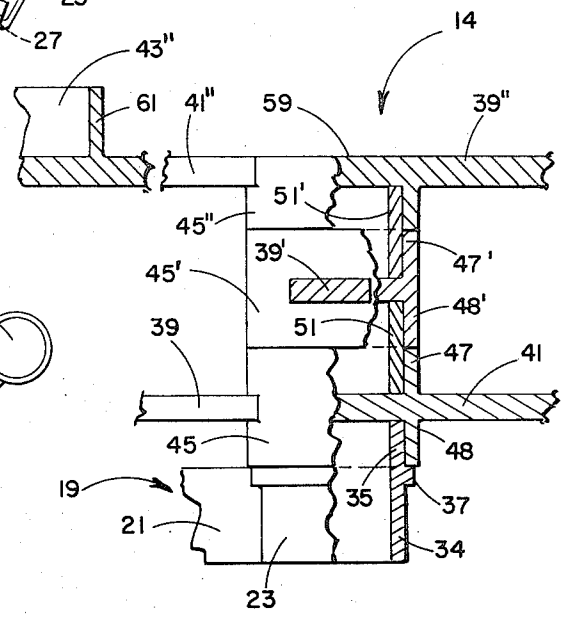


FIG. 3

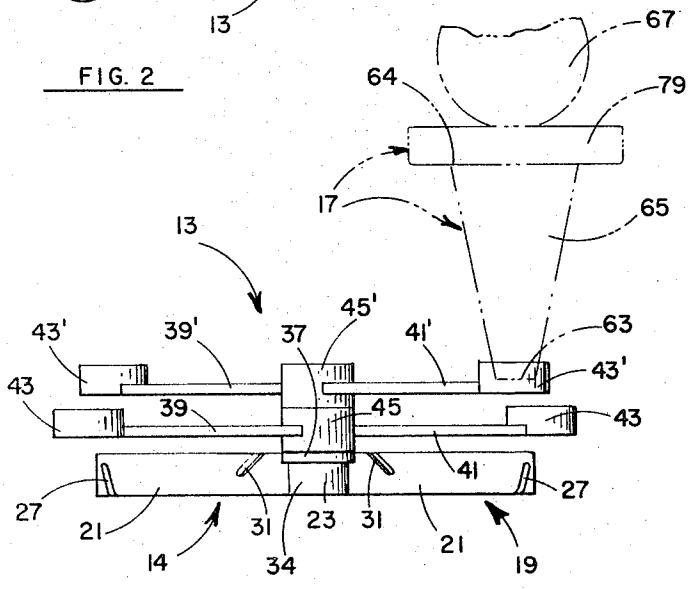


FIG. 4

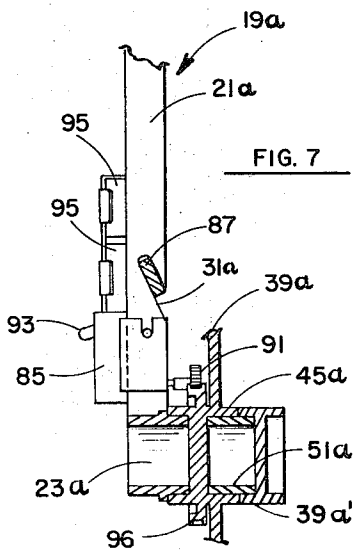


FIG. 7

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BALANCING DEVICE

This invention relates to a game or toy which can be utilized by young children as well as older children and adults, and is particularly valuable in teaching a child the motor skills of placement of differing objects to achieve desired balanced relationships. There has long been a fascination with jugglers and their remarkable ability to manipulate and delicately balance various shapes and weighted objects. The average individual, and particularly a child without many hours of practice, cannot succeed at achieving the ability to readily manipulate and balance objects in the manner of a juggler or balancer.

Thus, it is an object of this invention to provide a device that can be readily used by children and adults alike to enable them to balance objects (which may be of different shapes) in an interesting manner without requiring the skill of a professional juggler.

Briefly, the illustrated form of the invention comprises a body rack which includes an elongated support structure or frame adapted to be releasibly secured at one end to the body of the user and to extend outwardly therefrom in the forward direction. This releasible securement may be achieved by a harness arrangement which may include a strap or belt that extends around the user's waist. Added support for the free end of the frame may be provided as by means of a shoulder or neck strap which is attached to the frame at a place spaced from the user's body, the strap passing up and around the neck of the user. The illustrated frame terminates outwardly from the user's body in a fitting or connector means which can accommodate a plurality of arms mounted or stacked one on top of another to complete the body rack. The arms may be individually positioned to space apart their ends as desired. The arms preferably have at each end a cup or receptacle means capable of receiving a balancing object. The user of the device will attempt to balance as many of the objects as he can on the arms, and then on underlying objects already on the arms. The objects may be of various shapes, as for example spherical, frusto-conical or flat and disk-like. A drive means may be provided if desired to effect slow rotation of the arms to increase the difficulty of the balancing. It is believed that the invention will be better understood from the following detailed description and drawings in which:

FIG. 1 is a view of a user and a balancing device comprising a form of the invention, the user being shown balancing a plurality of objects on the device.

FIG. 2 is an enlarged top plan view of the preferred form of the device.

FIG. 3 is a further enlarged cross sectional view taken generally along line 3—3 of FIG. 2.

FIG. 4 is a front view of the device of FIG. 2.

FIGS. 5A thru 5E depict different objects that can be utilized with the device for balancing purposes.

FIG. 6 is a top plan view of the form of the device of FIG. 1 which has a motor means.

FIG. 7 is a sectional view taken generally along line 7—7 of FIG. 6.

Turning now to the drawings, there is seen in FIG. 1 an individual or user 11 having a balancing device 13, supported on him in operative position, with a body rack of the device extending outwardly in front of him. FIGS. 2, 3 and 4 show the presently preferred form of the device, while FIGS. 1, 6 and 7 shown an alternate

form. The user 11 is shown placing a plurality of objects 17 on the balancing device to achieve a balanced effect. As seen best in FIG. 2, the device 13 comprises the body rack 14 which includes an elongated support structure 19 in the form of an open frame. The frame 19 includes two side rods or members 21 which converge toward one another, coming together at their forward ends where they connect to a center fitting 23 which serves as a connector means. The two side members 21 are secured adjacent their divergent rear ends to the respective outer ends of a curved portion 24 of the frame 19 that conforms generally to the waist of the user.

The frame 19 is releasibly supported in the position shown in FIG. 1, with the curved portion 24 engaging the body of the user and with the side members 21 extending outwardly and away from the user in the forward direction. The frame is thus in effect a cantilevered beam adapted to support objects at its outer free end.

A belt or other type of body or waist strap or harness 25 which extends around the user's waist and is releasibly connected to the frame 19 may serve as the means to detachably hold the frame in position. In particular, at the rear end of each of the side members 21, a notch 27 may be provided as seen particularly in FIG. 4. The body strap 25 has loops at each end to detachably engage the notches 27. The frame 19 is also supported by a neck or shoulder strap or harness 29 which detachably connects to a forward portion of the frame. For this purpose, rearwardly angled notches 31 may be provided at the upper edges of the side members 21 adjacent their forward ends. Loops at the ends of the neck strap 29 may releasibly engage the respective notches 31.

The body and neck straps may be adjustable in length to accommodate different users. Also, as desired, the straps may be permanently secured to the frame, in which case the body strap would be made to open and close or be expandable so that the user could step into it. The frame or support structure may be made of any suitable material such as semi-rigid plastic. This type of material offers the advantage of relatively low cost and lightweight, with sufficient strength to support its own weight and that of the objects. Other material such as metal or wood could be utilized if desired for added strength and durability. The particular illustrated open construction of the frame is preferred as it combines lightweight with sufficient support capability, however other forms or shapes of support structure may be used. The means to releasibly attach the frame to the body and to provide support to its outer end may also vary. For example, means might be provided to clip the inner end of the frame to the user's belt. Further, for a particular combination of materials and designs of support structure, body connecting means, arms and balancing objects, it may be desired to use the device without an outer support such as the neck strap.

Turning to FIG. 3 particularly, there is seen the center fitting 23 which is generally an upright tube having a lower or base portion 34, and a cylindrical upper hub portion 35 that extends upwardly from a radial flange portion 37. The fitting 23 serves to support one or more arms 39 utilized with this device to provide the remainder of the body rack 14. Each of the illustrated arms 39 is comprised of a generally elongated straight flat bar 41 having cylindrical cups or receptacles 43 at each

end. Each arm **39** also has a fitting portion **45** at its center which serves as a connector means. The fitting portion **45**, as seen in FIG. **3**, is comprised of two cylindrical sleeves **47** and **48** which extend vertically upward and downward respectively from the bar **41**. The lower sleeve **48** of the arm **39** is received on the hub portion **35** of the central fitting **23**. The sleeve **48** may ride on the radial flange portion **37**. Each separate arm utilized in the device is preferably constructed in the same manner so that the arms are interchangeable in their relative positions on the frame. The arms, however, can be of different construction. They may also be of different coloring and of different overall length and/or configuration, i.e, they may be curved up or down or to the side. As seen in FIG. **3**, a second arm **39'** is supported on the first arm **39** through the use of a cylindrical connector **51** which has its lower half received in upper sleeve **47** of arm **39**. The upper half of connector **51** serves as a hub on which a lower sleeve **48'** of the arm **39'** is disposed. The connector **51** may provide a loose fit for easy relative movement of the arms **39** or they may provide a tight fit whereby the arms will rotate in unison. In FIG. **3** there is seen a third arm **39''** mounted on the top of arm **39'** by means of an additional connector **51'**. The top surface **59** of the uppermost arm **39''** may be entirely enclosed in the region of the center fitting for appearance purposes. Thus, this arm would be particularly designed as a top arm when a plurality of arms are stacked one upon another. The receptacles **43** open outwardly and have a cylindrical side wall **61** as seen in FIG. **3**. The inner diameter of the illustrated cylindrical wall **61** is sufficient to accommodate the smaller end **63** of a frusto-conical object **65** as shown in FIG. **4**. The receptacles **43** can be of varying shapes to accommodate different shaped objects.

Turning to FIGS. **5A–5E**, there are shown a plurality of objects **17** that may be stacked incident to operation of the illustrated device. The objects can be made of various materials. A lightweight material such as painted styrofoam, hollow plastic forms, balsa wood or the like, provide a number of advantages. They reduce the weight which the user and the frame **19** must support, and they are relatively easy to handle, transport and store. Alternate materials may be used as desired, depending on the strength of the frame, the size of the objects, the number of objects expected to be balanced, the age of the intended user, etc. In utilizing styrofoam or other lightweight construction, it is preferable to provide some added weight in the base of the object, particularly those that are delicately balanced, so as to provide a lowered center of gravity to aid in the balancing. For example, as seen in FIG. **5A**, a styrofoam spherical object or ball **67** has a flat base portion **69** and a weight in the form of a metal insert **71** disposed within the ball at the lower base portion **69**. This permits the ball **67** to be readily stacked on a surface in a manner to be further described. FIG. **5B** shows a second ball **67'** which also has a weight **71'** in its flat lower end **69'**. The balls or other objects may be provided with magnets which attract the metal weights and thereby serve to maintain objects in stacked condition. For example, the ball **67'** has a magnet **77** in its top opposite its weight **71'**. The magnet **77** facilitates another object, particularly another ball such at **67**, being balanced on top of ball **67'** with the magnet **77** acting to attract the weight **71**. FIGS. **5C** and **5D** depict an object in the form of a flat circular disk **79** having a metal weight **81** disposed in its center. The objects, particularly such as the disk, may have a mark such as a colored circle **80** at their centers to aid the depth perception of the user in placing the object in position and in balancing another object atop that object. FIG. **5E** depicts the frusto-conical object **65** with its narrow end **63** and a wider flat end **64**.

In utilizing the particular embodiment shown in the drawings, it is preferred to first place the narrow end **63** of the frusto-conical object **65** in the receptacle **43** so that the large flat end **64** is uppermost. FIGS. **1** and **4** show disk-shaped objects **79** placed on the ends **64**. This can then be followed by the user placing another frusto-conical object **65** upright on top of the disk-shaped object **79**, as the user in FIG. **1** is about to do. Alternately a spherical object or ball **67** can be placed on the disk-shaped object **79**, as shown in FIG. **4**. It should be readily apparent that various combinations of the balancing objects can be utilized. For example, spherical-shaped objects can be stacked on one another, particularly when they incorporate a magnet as shown in FIG. **5B**.

FIGS. **1**, **6** and **7** disclose an additional embodiment **13A** of this invention, wherein the arms **39A** mounted on the frame **19A** can be caused to rotate in a slow continuous manner while the user of the device is placing the objects thereon. This, of course, further adds to the difficulty in achieving and maintaining a delicate balance of objects. As seen in FIG. **6**, a motor or drive means **85** can be rigidly mounted on a side member **21A** of the frame. When utilizing the motor **85**, it is preferable to attach a transversely extending bar **87** to the side members **21A**. The bar **87** may have means such as slots **89** adjacent its ends to releasibly connect to the loops at the ends of the neck strap **29A**. The effect of this arrangement, is to move the attachment points of the neck strap **29A** outwardly so that there will be no interference between the neck strap and the rotating arms. Such an arrangement is seen in FIG. **1** as well as FIG. **6**, mounted on an individual using the device.

The motor **85** is provided with a small output drive gear **91** and an on-off switch **93**. Batteries **95** can be supported adjacent the motor to furnish the energy to drive the motor upon actuation of the switch **93**. The drive gear **91** engages a larger gear **96** which is attached to or integrally formed surrounding a cylindrical hub portion **45A** of an arm **39A**. Upon actuation of the motor **85**, the drive gear **91** causes the larger gear **96** to rotate together with the arm **39A**. Additional arms such as shown at **39A'** in FIGS. **6** and **7** may be connected to arm **39A** as by means of a cylindrical connector **51A** so that, the arms will turn together.

It should be apparent that the more arms utilized in the device, the more difficult the balancing becomes. The user of the device of the invention will develop great skill in obtaining the ability to determine the correct placement of a given object on the structure so as not to unduly tilt it and thereby cause objects to fall. For example, when a given object is placed on the support structure in a position, the next object must be placed relative thereto so as to counter balance and not cause the structure to tilt. As can be appreciated, the construction of the support structure together with the utilization of the neck and waist straps help to stabilize the device and will to some extent counteract a disproportionate balance.

I claim:

1. Balancing apparatus comprising, in combination:
a body rack having spaced apart first and second portions,
body attachment means connected to said body rack for releasably attaching said first portion of said body rack to the body of a user with said second portion positioned outwardly in front of the body of such user,
support means mounted on said second portion of said rack for supporting a plurality of objects, said support means defining at least two spaced apart support areas, and
a plurality of separate objects configured for balancing upon said support areas, said objects being balanced upon said support areas.

2. The apparatus of claim 1 wherein:
said support means comprises at least one arm having at least two of said spaced apart areas thereon for receiving said objects.

3. Balancing apparatus comprising, in combination:
a body rack having spaced apart first and second portions,
body attachment means connected to said body rack for releasably attaching said first portion of said body rack to the body of a user with said second portion positioned outwardly in front of the body of such user,
support means mounted on said second portion of said rack for supporting a plurality of objects, said support means defining at least two spaced apart support areas, and
a plurality of separate objects configured for balancing upon said support means,
said support means comprising at least one arm having at least two of said spaced apart areas thereon for receiving said objects,
said body rack having a first connector means at said second rack portion for connecting to said arm,
and said arm having a corresponding second connector means thereon for variable engagement with said first connector means to support said arm on said body rack in selected positions.

4. The device of claim 3 wherein said arm is mounted for rotation relative to said body rack, further including:
a drive means on said body rack for rotating said arm.

5. Balancing apparatus comprising, in combination:
a body rack having spaced apart first and second portions,
body attachment means connected to said body rack for releasably attaching said first portion of said body rack to the body of a user with said second portion positioned outwardly in front of the body of such user,
support means mounted on said second portion of said rack for supporting a plurality of objects, said support means defining at least two spaced apart support areas, and
a plurality of separate objects configured for balancing upon said support areas,
said support means comprising at least one arm having at least two of said spaced apart areas thereon for receiving said objects,
at least two of said arms being provided,
said arms having connection means thereon for detachably connecting to one another and to said body rack for supporting more than one arm on said body rack.

6. Balancing apparatus comprising, in combination:
a body rack having spaced apart first and second portions,
body attachment means connected to said body rack for releasably attaching said first portion of said body rack to the body of a user with said second portion positioned outwardly in front of the body of such user,
support means mounted on said second portion of said rack for supporting a plurality of objects, said support means defining at least two spaced apart support areas, and
a plurality of separate objects configured for balancing upon said support areas,
said support means comprising at least one arm having at least two of said spaced apart areas thereon for receiving said objects,
said body rack having connector means at said second rack portion for connecting to said arm,
said arm being a generally straight elongated member having a receptacle at each end thereof for receiving one of said objects, said arm geing supported on said connector means at about the midpoint between the ends of said arm.

7. Balancing apparatus comprising, in combination:
a body rack having spaced apart first and second portions,
body attachment means connected to said body rack for releasably attaching said first portion of said body rack to the body of a user with said second portion positioned outwardly in front of the body of such user,
support means mounted on said second portion of said rack for supporting a plurality of objects, said support means defining at least two spaced apart support areas, and
a plurality of separate objects configured for balancing upon said support areas,
said body attachment means comprising a first attachment means for releasably supporting said first portion of said body rack at about the waist of the user and a second attachment means for releasably supporting said body rack at a point thereon spaced outwardly in front of the user.

8. The device of claim 7 wherein:
said second attachment means comprises a strap for connecting to said body rack at a said point spaced outwardly from said first portion thereof and for extending up and around the neck of the user.

9. The device of claim 7 wherein said body rack comprises an open A-frame with its apex spaced from the user and with its inner end being curved to conform to the contour of the user's body.

10. Balancing apparatus comprising, in combination:
a body rack having spaced apart first and second portions,
body attachment means connected to said body rack for releasably attaching said first portion of said body rack to the body of a user with said second portion positioned outwardly in front of the body of such user,
support means mounted on said second portion of said rack for supporting a plurality of objects, said support means defining at least two spaced apart support areas, and

a plurality of separate objects configured for balancing upon said support areas,

magnetic means being provided in said objects to magnetically hold objects in balanced position relative to one another.

11. Balancing apparatus comprising, in combination:

a body rack having spaced apart first and second portions,

body attachment means connected to said body rack for releasably attaching said first portion of said body rack to the body of a user with said second portion positioned outwardly in front of the body of such user,

support means mounted on said second portion of said rack for supporting a plurality of objects, said support means defining at least two spaced apart support areas, and

a plurality of separate objects configured for balancing upon said support areas,

said objects being made of styrofoam, said objects being weighted to provide a low center of gravity.

12. A balancing device comprising:

an elongated cantilever beam having an inner end and an outer end,

attachment means for releasably attaching the beam at its inner end to the body of the user,

an arm carried adjacent the outer end of said beam and extending transversely outwardly therefrom in generally opposite directions, and

support means on said arm adjacent each outer end thereof for supporting one or more objects thereon.

13. A method of balancing objects comprising the steps of:

releasably affixing a support structure in a set position on the body of the user,

causing substantial movement of a portion of the structure relative to the user, while simultaneously placing objects in balanced positions on the moving portion of the structure and on other objects already balanced on that portion of the structure, said movement being effected in a substantially horizontal plane.

14. The method of claim **13** wherein the movement is a rotary movement.

* * * * *