

1

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BALANCE GAME APPARATUS

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8 Claims 5

2

ABSTRACT OF THE DISCLOSURE

Apparatus for use in a balancing game. There are a plurality of cover members of identical construction each arbitrarily marked so as to be distinguishable from other cover members. There are also a plurality of body members having the same external appearance when attached to a cover member, but having indicia indicative of their relative weights. When a body member is attached to a cover member, the weight indicia is concealed and each of the combined cover and body member units looks the same as each other unit except for the arbitrary markings on the cover members. A balance scale is also included. In one embodiment the body members are hollow and differently weighted inner members are inserted in the hollows.

This invention relates to game and puzzle apparatus. It has to do especially with apparatus suitable for use in novel games and puzzles wherein objects are placed on opposite sides of a balance to determine their relative weights with the purpose of determining, by a number of such comparisons of individual objects or groups of objects, which individual objects are heavier or lighter than others.

The apparatus of this invention can be used in playing and solving a wide variety of such games and puzzles. In the simplest, all of the objects except one may have the same weight. In the most complex, the objects may all differ in weight. In between are games and puzzles of various degrees of complexity suitable for persons of virtually all ages and levels of intelligence. These have proved to be fascinating pastimes that not only entertain the participants but also enhance and sharpen their reasoning habits.

In accordance with the present invention, typical apparatus suitable for use in games and puzzles comprises a plurality of objects, each having an external appearance such as to distinguish it from other said objects, means for selectively causing any said object to be substantially equal in weight to, or measurably different in weight from, another said object without changing the external appearance of any said object, and balance means for comparing the weight of at least one said object with the weight of at least one other said object.

Such apparatus may comprise a plurality of first members, substantially equal in weight, each having an external appearance such as to distinguish it from other said first members; a plurality of second members, at least one said second member having a weight measurably different from the weight of another said second member, each said second member being so shaped as to be attachable to, and removable from, any said first member, and indistinguishable in external appearance from the other said second members when attached to a first member; and balance means for comparing the weight of at least one said second member, each attached to a first

member, with the weight of at least one other said second member, each attached to a first member.

A typical embodiment of such apparatus suitable for use in games and puzzles may comprise a plurality of cover members, each bearing a distinctive feature of external appearance, such as a marking, but being otherwise identical (which of course includes being equal in weight) to the other said cover members; a plurality of body members, to and from which said cover members may be attached and removed; said body members when attached respectively to said cover members being identical in external appearance, the markings or other distinctive features on said cover members thus providing the only differences in the external appearances of the combined members; at least one said body member having a weight measurably different from the weight of another said body member; and balance means for comparing the weight of at least one of said attached cover and body members with the weight of at least one of the other said attached cover and body members.

Another typical embodiment may comprise a plurality of containers, each substantially equal in weight, each having an external appearance (as by being marked) such as to distinguish it from other said containers; at least one member capable of being fitted inside any said container without changing the external appearance of said container; and balance means for comparing the weight of at least one said container and any members therein with the weight of at least one other said container and any members therein.

A suitable form of the balance means comprises a rigid member that is pivotable about a horizontal axis substantially in vertical alignment with its center of gravity when placed on a supporting member in contact therewith adjacent to said axis, the rigid member having means thereon for receiving a plurality of the objects whose weights are to be compared and maintaining said objects at a pair of locations horizontally equidistant from, and on opposite sides of, said center of gravity. In other typical apparatus, the balance means may comprise a rigid member that is pivotable about a horizontal axis substantially in vertical alignment with its center of gravity when placed on a supporting member in contact therewith adjacent to said axis, said rigid member having means thereon for receiving a pair of the objects whose weights are to be compared and maintaining said objects at least partially nested at locations horizontally equidistant from, and on opposite sides of, said center of gravity; each said object being symmetrical about an axis and so shaped that each object can partially nest coaxially in any other said object, whereby a plurality of said objects can be stacked coaxially at said locations on said rigid member.

In the drawings:

FIG. 1 is a perspective view of an object for weight comparison in a typical embodiment of the present invention.

FIG. 2 is an exploded perspective view from below of an object as shown in FIG. 1.

FIG. 3 is an exploded perspective view from above of an object as shown in FIGS. 1 and 2.

FIG. 4 is a perspective view of a body member comprising part of an object as shown in FIGS. 1-3.

FIG. 5 is a perspective view of a balance means for use with objects as shown in FIG. 1-3 according to this invention.

FIG. 6 is a front view of the balance means of FIG. 5 with a plurality of objects fitted thereon for comparing the weights of the objects.

FIG. 7 is an exploded perspective view of another form of object for weight comparison according to the present invention.

FIG. 8 is a perspective view of some typical inner members used in forming objects as shown in FIG. 7.

FIG. 9 is a perspective view of another form of balance means for comparing the weights of objects in accordance with this invention.

As shown in FIGS. 1-3, an object 20 for weight comparison in apparatus of the present invention comprises a cover member 21 and a body member 22. Each cover member 21 bears a distinctive feature of external appearance such as a marking 23 to distinguish it in external appearance from other cover members 21. The cover members 21 are all substantially equal in weight and preferably are identical except for the distinctive feature 23, which is different on each cover member 21.

Each body member 22 is so shaped as to be attachable to, and removable from, any cover member 21, and indistinguishable in external appearance from the other body members 22 when attached to a cover member 21. As shown in FIGS. 1-4, the cover members 21 and the body members 22 may be cylindrical in shape and attachable by merely pressing them together in a press fit as shown in FIG. 1. If preferred, of course, threaded connections (not shown) could be used in attaching the members 21 and 22 to form an object 20.

At least one body member 22 has a weight measurably different from the weight of another body member 22, as is indicated in FIGS. 3 and 4. In FIG. 3 the body member 22 has a light and shallow bottom portion as indicated at 24 compared to the heavier and deeper bottom portion indicated at 25 in the body member 22 of FIG. 4. For convenience the relative weights of various body members may be indicated by markings as shown at 26 and 27 in FIGS. 3 and 4. These markings are visible when the body members 22 are uncovered, but are not visible when the body members 22 are attached to respective cover members 21 to form objects 20. Thus, as is apparent from FIGS. 1-4 and 6, the body members 22 when attached respectively to cover members 21 are identical in external appearance, and the markings or other distinctive features 23 on the cover members 21 provide the only differences in the external appearances of the combined members 21, 22 forming the objects 20.

Each cover member 21 is symmetrical about its vertical axis and is provided with a coaxial cylindrical recess 28 in its upper portion. Similarly each body member 22 is symmetrical about its vertical axis and is provided with a coaxial cylindrical projection 29 at its lower end. The diameter and depth of the projection 29 on each body member 22 are slightly smaller than the corresponding dimensions of the recess 28 in each cover member 21, so that the lower projection 29 on any object 20 will fit easily, but not too loosely, in the recess 28 of any other object 20. Thus each object 20 is symmetrical about its vertical axis and is so shaped that it can partially nest coaxially with any other object 20, and a plurality of the objects 20 can readily be stacked coaxially.

FIGS. 5 and 6 show balance means 30 suitable for comparing the weight of at least one object 20 with the weight of at least one other object 20. The balance means 30 comprises a balance arm 31 having cylindrical extremities 32, 33 and a base 34. The balance means 30 is symmetrical, at least from left to right, about its center of gravity 35. The cylindrical extremities 32, 33 have shallow cylindrical recesses 36 and 37, respectively, therein substantially identical to the recesses 28 in the objects 20. The bottom 38 of the base 34 may be flat as shown in FIGS. 5 and 6 to keep the balance 30 from being too sensitive, or if preferred it may be rounded slightly to make it more sensitive.

As is apparent from FIGS. 5 and 6, the balance means 30 comprises a rigid member 31-34 that is pivotable about a horizontal axis at 38 substantially in vertical alignment with its center of gravity 35 when placed on a supporting member 39 (FIG. 6) such as an ordinary table top or other substantially flat horizontal surface, in contact with the balance means 30 adjacent to its axis at 38. The rigid member has means 32, 36 and 33, 37 thereon for receiving a pair of the objects 20 whose weights are to be compared at locations 36, 37 horizontally equidistant from, and on opposite sides of, the center of gravity 35. Since each object 20 is symmetrical about its vertical axis and so shaped, at 28 and 29, that each object 20 can partially nest coaxially in any object 20, a plurality of the objects 20 can be stacked coaxially at the locations 36, 37 on the rigid member 31-34, as shown in FIG. 6, horizontally equidistant from the center of gravity 35.

If the total weight of the three objects 20 on the left side of the balance means 30 is equal to the total weight of the three objects 20 on the right side, the balance means 30 will remain horizontal as shown in FIG. 6. If the weights are not equal the balance means 30 will of course tip downward on the side bearing the larger total weight. Thus the balance means 30 provides a comparison of the weight of the objects 20 on one side thereof with the weight of other objects 20 on the opposite side of the balance means 30.

FIG. 7 shows another form of object formed by a container 40 comprising a cylindrical lid 41 and a cylindrical base 42, which can be press fit together as in FIG. 9. One or more inner members 43 can be placed inside any container 40 without changing the external appearance of the container 40. The inner members 43 may have various sizes and weights, some the same as others, some different, as is shown in FIG. 8. Each container 40 is substantially equal in weight and has an external appearance, as by being marked at 44, such as to distinguish it from other containers 40. By selecting the appropriate inner members 43 the entire object comprising the container 40 and any hidden inner member or members 43 may selectively be caused to be substantially equal in weight to, or measurably different in weight from, another such entire object whose weight is to be compared, without changing the external appearance of any such object.

FIG. 9 shows a suitable form of balance means 50 for use in comparing the weights of container objects 40. (It can also be used for comparing the weights of objects 20.) The balance means 50 comprises a rigid balance arm member 51 that is pivotable about a horizontal axis substantially in vertical alignment with its center of gravity, when placed on a supporting member 53 in contact therewith adjacent to the axis, as on the rounded contacting surfaces shown at 52. The rigid member 51 has upright members 54 thereon at its opposite extremities 55, 56. The upright members 54 define cylindrical spaces above 55 and 56 for receiving a plurality of the container objects 40 (or of the objects 20) whose weights are to be compared, and maintaining the objects at a pair of locations 55, 56 horizontally equidistant from, and on opposite sides of, the center of gravity.

The apparatus of FIGS. 1-9 may be made of any suitable plastic, metal, or other desired material. Although more expensive, a conventional balance may be substituted for the balance means 30 or 50. Instead of the markings 23, 44, other distinctive features of external appearance such as relief designs, pictures, and special outer shapes may be provided on the cover members 21 and lids 41. An alternative form of container object may comprise an envelope which may contain one or more cards to increase its weight selectively. The containers 40 may be modified to include nesting protrusions and recesses as in the objects 20. Conversely, the nesting feature of the objects 20 may be omitted, as in the containers 40. To provide additional combinations of weight of the objects

20, inner members as in FIG. 8 may be placed inside where needed.

A typical use of the apparatus of this invention in games and puzzles is described below, referring particularly to the apparatus shown in FIGS. 1-6. Other similar uses of the apparatus of FIGS. 1-6 and of the apparatus of FIGS. 7-9 will be apparent from this description.

Sixteen cover members 21 are mixed, as by shaking in a box, and are placed upside down on a table. Sixteen body members 22, fourteen of which are equal in weight, one of which is lighter than each of the fourteen and one of which is heavier than each of the fourteen, are similarly mixed and then placed upside down on the table. The heavier and lighter body members 22 differ in weight from the fourteen others by equal amounts. For example, they might be one gram heavier and one gram lighter, respectively. Thus, together they weigh the same as any two of the fourteen body members 22 that are equal in weight. Each body member 22 is attached to a cover member 21 by pressing the members 21, 22 together without looking at the markings on any of the members. In this manner sixteen objects 20 have been prepared, fourteen of which are equal in weight, one of which is a unit lighter, and one of which is a unit heavier; but it is not known which are the heavy or light objects.

The sixteen objects are mixed and separated into four groups with four objects in each group. The objects in each group are stacked. The objects in the first group are placed on one side of the balance member 30 and the objects in the second group are placed on the opposite side of the balance member 30 as in FIG. 6.

Any number of players may participate, either individually or in teams. Each participant records the result of the comparison of the weights of the four objects on each side of the balance means 30. The total weight of the four objects in the third group is then compared in the same way with the total weight of the four objects in the fourth group, and each participant records the results. This is one inning.

The objects are again mixed and grouped in four equal groups, preferably with the objects upside down to assure a random chance distribution. The weights are again compared, and so on, for as many innings as are necessary. At the end of the second inning, and every inning or half inning thereafter, the players are given time to analyze the results, make notes, and try to determine which are the heavier and lighter objects. If more than one player identifies them correctly at the end of the same half inning, the result is a tie. Other appropriate rules are fairly obvious.

The games can vary all the way from the very simple for beginning youngsters to the very complex for advanced adults. To eliminate chance, preferably in the more complex games, each player may be allowed to decide which objects to compare. In other variations, the players may be given equal amounts of, but different, secret information by permitting each player to make one or more comparisons the results of which are not given to the other players. In some of the advanced games the objects may have many different weights.

While the social and competitive stimulation adds zest to the games as played by a group of participants, the games can also provide many fascinating hours of fun when used as solitaire games and puzzles.

Teachers can use the games to illustrate various concepts and uses of sets, logic, base 3 numbers, equalities, inequalities, ordering, and other mathematical ideas. With a bit of enthusiasm and ingenuity, the apparatus of this invention can help make learning the "new" mathematics an exciting adventure.

While the forms of the invention disclosed herein constitute presently preferred embodiments, it is not intended to describe or mention all of the possible equivalent forms or ramifications of the invention. It is to be understood that the disclosure herein is illustrative rather than limit-

ing, and that various changes may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. Apparatus suitable for use in games and puzzles comprising

a plurality of first members, substantially equal in weight, each having an external appearance such as to distinguish it from other said first members,

a plurality of second members, at least one said second member having a weight measurably different from the weight of another said second member, each said second member being so shaped as to be attachable to, and removable from, any said first member, and indistinguishable in external appearance from the other said second members when attached to a first member,

and balance means for comparing the weight of at least one said second member, each attached to a first member, with the weight of at least one other said second member, each attached to a first member.

2. Apparatus suitable for use in games and puzzles comprising

a plurality of cover members, each bearing a distinctive feature of external appearance but being otherwise identical to the other said cover members,

a plurality of body members, to and from which said cover members may be attached and removed, said body members when attached respectively to said cover members being identical in external appearance, the distinctive features on said cover members thus providing the only differences in the external appearances of the combined members,

at least one said body member having a weight measurably different from the weight of another said body member,

and balance means for comparing the weight of at least one of said attached cover and body members with the weight of at least one of the other said attached cover and body members.

3. Apparatus according to claim 2, wherein said balance means comprises a rigid member that is pivotable about a horizontal axis substantially in vertical alignment with its center of gravity when placed on a supporting member in contact therewith adjacent to said axis, said rigid member having means thereon for receiving a plurality of objects, each comprising one said cover member and an attached body member, whose weights are to be compared and maintaining said objects at a pair of locations horizontally equidistant from, and on opposite sides of, said center of gravity.

4. Apparatus according to claim 2, wherein said balance means comprises a rigid member that is pivotable about a horizontal axis substantially in vertical alignment with its center of gravity when placed on a supporting member in contact therewith adjacent to said axis, said rigid member having means thereon for receiving a pair of objects, each comprising one said cover member and an attached body member, whose weights are to be compared and maintaining said objects partially nested at locations horizontally equidistant from, and on opposite sides of, said center of gravity, and wherein each said object is symmetrical about an axis and so shaped that each object can partially nest coaxially in any other said object, whereby a plurality of said objects can be stacked coaxially at said locations on said rigid member.

5. Apparatus suitable for use in games and puzzles comprising

a plurality of cover members, each bearing a distinctive marking but being otherwise identical to the other said cover members,

a plurality of body members, to and from which said cover members may be attached and removed, said body members when attached respectively to said cover members being identical in external appearance, the markings on said cover members thus pro-

7

viding the only differences in the external appearances of the combined members, at least one said body member having a weight measurably different from the weight of another said body member,

and balance means for comparing the weight of at least one of said attached cover and body members with the weight of at least one of the other said attached cover and body members.

6. Apparatus according to claim 1, wherein each said second member has a feature of external appearance, indicative of its relative weight, that is visible when said second member is detached but is concealed from view when said second member is attached to a first member.

7. Apparatus according to claim 2, wherein each said body member has a feature of external appearance, indicative of its relative weight, that is visible from said body member is detached but is concealed from view when said body member is attached to a cover member.

8. Apparatus according to claim 5, wherein each said

8

body member bears a marking, indicative of its relative weight, that is visible when said body member is detached but is concealed from view when said body member is attached to a cover member.

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273—153; 35—30

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

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Philip M. Dunson

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the sheet of drawings, line 2 and in the heading to the printed specification, line 2, title of invention "BALANCE GAME APPARATUS", each occurrence, should read -- WEIGHT COMPARISON BALANCE GAME APPARATUS --. Column 1, line 11, beginning with "Apparatus for" cancel all to and including "hollows." in line 24, same column 1, and insert

Groups of objects are placed on opposite sides of a balance to determine their relative total weights. From a series of group comparisons players deduce which individual objects are heavier or lighter than the others.

A plurality of cover members of identical construction are arbitrarily marked so that each is distinguishable from the others. A plurality of body members have the same external appearance when each is attached to a cover member, but have indicia indicative of their relative weights. When a body member is attached to a cover member, the weight indicia are concealed and each combined cover and body member unit (object) looks the same as each other unit except for the arbitrary markings on the cover members. In one embodiment the body members are hollow, and differently weighted inner members are inserted in the hollows.

Column 4, lines 10 and 11, cancel "nested at locations 36, 37 horizontally equidistant from, pared and maintaining the objects 2 at least partially" and insert -- pared and maintaining the object 20 at least partially nested at locations 36, 37 horizontally equidistant from, --. Column 7, line 17, "from" should read -- when --.

Signed and sealed this 18th day of November 1969.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
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