

5 The invention relates to a combination toy having
several segment portions, which are subdivided into
parallel of latitude and meridian sectional planes and
are operatively connected with correspondingly
10 associated and formed holding and connecting elements,
and sliding portions which are arranged thereon and can
be adjusted with respect to each other for the purpose
of occupying a certain position on the spherical body
surface along the individual parallels of latitude and
15 also in the direction of the meridians.

A toy is known from WO-A 81/01638, which toy has
the outer shape of a sphere and is subdivided by
sections along the meridians and also sections along
15 the parallels of latitude into a plurality of sliding
portions. The individual sliding portions, which are
arranged on the spherical surface and are operatively
connected to each other by means of a functional
device, on the one hand, can be displaced about a
20 hypothetical axis of rotation along the parallels of
latitude over the whole spherical surface and, on the
other hand, the sliding portions, which lie in the
lower or upper region, can be twisted in relation to
each other by holding fast the sliding portions, which
25 are not to be adjusted, along the meridians, in order
to achieve a desired play combination. The functional
device, formed from the individual carrier, connecting,
expanding and holding elements arranged inside the
spherical body, is comparatively expensive in terms of
construction.

30 The underlying object of the invention is to
improve the construction of the individual elements, in
the case of a combination toy of the kind mentioned, to
the effect that whilst maintaining an almost unlimited
number of different positions, it is possible to
35 achieve functionally reliable adjustability along the
individual parallels of latitude and also along the
meridians.

The solution, according to the invention, to the
problem of achieving the object is characterised by a
40 first, inner spherical body, a second, central
spherical body, a third, outer spherical body and the
sliding portions which are arranged on the outer
spherical body in an adjustable manner, in which case

- 45 - the central spherical body and also the outer
spherical body are subdivided, in each case, into
an equal number of segment portions and, for the
purpose of effecting the movement of adjustment
oriented in the meridional direction relative to
the inner spherical body, are operatively
50 connected to each other by means of corresponding
holding and connecting elements; and
- the individual segment portions of the outer
spherical body are provided on their exterior with
pockets which are arranged spaced apart from each

other and in the assembled state form guide-tracks on the surface of the outer spherical body, which tracks are oriented in the peripheral direction and in which there are guided the sliding portions which are adjustable along the parallels of latitude.

Further advantageous developments and features of the invention emerge from the following description in conjunction with the drawing and the individual claims.

The invention is described in the following in conjunction with the drawing.

Figure 1 shows a combination toy represented in elevation and formed as a sphere;

Figure 2 shows the toy according to Figure 1 in a top view;

Figure 3 shows the toy according to Figure 1 represented partly in elevation and partly cut open;

Figure 4 shows the toy represented partly cut open and in a top view according to Figure 2;

Figure 5 shows a first detail of the toy represented in section according to the line A-A in Figure 3;

Figure 6 shows a section represented on a larger scale according to the line B-B in Figure 4;

Figure 7 shows a section represented on a larger scale according to the line C-C in Figure 6;

Figures 8-10 show a connecting element represented in elevation and in a top view and also in section according to the line D-D in Figure 8;

Figures 11-12 show an inner portion represented in elevation and also a section through the inner portion according to the line E-E;

Figure 13 shows a detail of the inner portion represented in elevation according to the direction of arrow F in Figure 11;

Figures 14-15 show an inner spherical body represented in elevation and in a top view; and

Figure 16 shows a detail of the inner spherical body represented in section according to the line G-G in Figure 14.

A combination toy, denoted in its entirety by 150 and formed as a spherical body 50, is represented in elevation in Figure 1 and in a top view in Figure 2. The spherical body 50 has, in the case of this exemplary embodiment, four individual spherical sections Ka1, Ka2, Ka3 and Ka4 (Figure 1), substantially formed by sectional planes E, E' and E" oriented parallel to each other, and also eight individual spherical sectors Ks1, Ks2, Ks3, Ks4, Ks5, Ks6, Ks7 and Ks8 (Figure 2). The segment portions, formed by the subdivision between an upper pole N and the sectional plane E and also between a lower pole S and the sectional plane E", are of substantially triangular shape and denoted throughout by 2, whilst

the other segment portions formed between the sectional planes E and E" are of substantially trapezoidal shape and denoted throughout by 1. The inner structure of the spherical body 50, substantially formed of holding and connecting elements, is formed so that the individual spherical sections Ka1 to Ka4 are rotatable about a hypothetical axis of rotation X-X in the direction of arrow X' and the individual spherical sectors Ks1 to Ks8 are adjustable substantially about a hypothetical axis Y-Y in the direction of arrow Y'.

The individual segment portions 1 and 2 arranged on the periphery of the spherical body 50 are displaceable relative to each other, for example for the purpose of representing an image, a figure or the like, and are denoted in the following as sliding portions 1 or 2.

The structural and functional construction with the corresponding constructive details of the spherical body 50 and also of the holding and connecting elements is described in detail in the following (without consideration of the numerical sequence of the Figures).

A part of the spherical body, denoted in its entirety by 50, is represented in Figure 6 on a larger scale and in section according to the line B-B in Figure 4 and in Figure 7 according to the line C-C in Figure 6 and there can be seen an inner spherical body denoted by 6, a central spherical body 4, surrounding the inner spherical body 6 and formed of several portions 14, and also an outer spherical body 3 which surrounds the central spherical body 4, is formed of several portions 30 and on which there are arranged the sliding portions 1, 2 which in the assembled state form a spherical surface of representation 10 (Figure 3).

The first, inner spherical body 6, which is represented in Figures 14 and 15 in elevation and in a top view, is formed, for example, as a single or multi-part, preferably one-piece hollow body and is manufactured of transparent plastics material or the like. A number of substantially L-shaped slots 7 are arranged evenly distributed over the periphery of the spherical body 6, with eight slots in total, that is, four slots above and four slots below (represented in broken lines in Figure 15) the centre of the sphere, being provided in the exemplary embodiment represented. The L-shaped slots 7 can also be arranged as a recess with a certain depth (not represented) in the spherical body wall 6' or else, as represented in Figure 16 in section according to the line G-G (Figure 14), preferably penetrate the wall 6'.

The central spherical body, denoted in its entirety by 4 in Figure 6 and Figure 7, comprises several segment portions 14 which are formed in the shape of a spherical shell and are connected to each

other by means of correspondingly formed connecting elements 5, as represented in profile cross-section in Figure 7, to give a unit forming the central spherical body 4.

5 An individual segment portion 14 of the central spherical body 4 is represented in Figure 11 in elevation and in Figure 12 in profile cross-section according to the line E-E (Figure 11) and on both sides there can be seen grooves 15, 15' running parallel to 10 the outer contour and cross-pieces 16, 16' and also at least one recess 17 which in the exemplary embodiment represented is arranged substantially in the central region (Figure 11) of the segment portion 14. Still 15 further recesses (not represented) can be provided corresponding to the recess 17. The recess 17 penetrating the wall of the segment portion 14 is larger on the segment portion inside than on the segment portion outside (Figure 12). As further 20 represented in Figure 11, provided on the one side in the upper region and on the other side in the lower region there is an incision 18, 18' which is formed in the manner of a notch and is represented on a larger scale in Figure 13 in accordance with the direction of arrow F.

25 A connecting element 5 is represented as a detail in elevation and in a top view in Figure 8 and Figure 9. The connecting element 5, formed in accordance with the central spherical body 4 so as to be substantially semi-circular arc-shaped, has, as represented in Figure 30 10, in section according to the line D-D (Figure 8), a substantially T-shaped profile cross section in which two lateral cross-pieces 19, 19' are formed so that they engage in the assembled state, as represented on a larger scale in Figure 7, into the grooves 15, 15' of 35 the segment portions 14, whilst a central cross-piece 20 is guided resting laterally against the cross-pieces 16, 16' of the respective segment portion 14. A circumferential groove 24, 24' is provided, in each case, between the lateral cross-pieces 19, 19' and the 40 central cross-piece 20, into which groove the cross-pieces 16, 16' of the respective segment portion 14 engage (Figure 7). At least two stop elements 25, 25', which are arranged spaced apart from each other, are provided on the outer periphery of the connecting 45 element 5, the individual screen (sic) element 25 or 25' having a spring element 21, 21', arranged in a correspondingly formed recess 23, 23' with cams 22, 22' laterally pre-formed thereon. The spring element 21, 21', which is substantially formed from the central 50 cross-piece 20 of the connecting element 5 and is arranged in the recess 23, 23' constructed in the manner of a slot, is constructed such that, when the connecting element 5 is inserted into the respective groove 15, 15' of the individual segment portion 14

like a circular arc, the cam 22, 22' slides along the inside of the segment portion 14 so that the individual spring element 21, 21' is radially deflected inwards, that is, into the respective slot 7 of the spherical body 6 and remains deflected for so long until in a certain position the cam 22, 22' on account of the spring-elastic restoring force engages in a detachable manner into the corresponding incision 18, 18' of the segment portion 14 and thus the individual segment portion 14 forms a unit with the connecting element 5. The central spherical body 4 comprises eight segment portions 14 and also eight connecting elements 5.

The outer spherical body 3 comprises the same number of segment portions as the central spherical body 4, in which case the individual segment portion denoted with 30, as represented in Figure 7 on a larger scale, has on the inner side facing the central spherical body 4 at least one stop element 31 which catches in the recess 17 of the respective segment portion 14 of the central spherical body 4, for example by a snap action, so that the portions 14 and 30 substantially form a unit. Provided on the outside of the individual arcuate segment portion 30, as represented in Figure 6, there are pockets 40 which are oriented in the peripheral direction and are arranged spaced apart from each other. The individual circular arc-shaped pocket 40 is formed by means of an incision 36 oriented parallel to the inside or to the inner wall respectively with base 33 and by an opening 35 which is delimited by cross-pieces 34, 34'. In the assembled state, in which the individual spherical bodies 6, 4 and 3 are joined together to form a constructional unit, the pockets 40 form a self-contained, circumferential guide-track for the sliding portions 1 and 2 oriented along the parallels of latitude.

The individual sliding portion 1 and 2, formed on the outside so as to be substantially circular arc-shaped, has, on the inside facing the individual segment portion 30 of the outer spherical body 3, two guide elements 13, 13' which are arranged spaced apart from each other, engaging into the pockets 40, are formed so as to be substantially L-shaped and engage, in each case, into the opening 35 with a cross-piece 11, 11' directed substantially radially inwards and into the incision 36 of the guide-track (pocket 40) with a sliding piece 12, 12' which is oriented substantially in the peripheral direction. The sliding piece 12, 12' is, in this connection, as represented in Figure 6, guided so as to rest against the inside of the cross-pieces 34, 34' of the opening 35.

The combination toy 150 is represented in Figure 3 partly in elevation and partly cut open and there can be seen on the one side, which has been cut open, the outer spherical body, which is formed of the individual

segment portions 30 and is denoted in its entirety by 3, and also the sliding portions 1 and 2 which can be adjusted about the so-called axis of rotation X in the pockets 40 of the spherical body 3 in the direction of arrow X' and which in their entirety form the spherical surface of representation 10. Individual stop devices, which are not designated in their entirety in greater detail, are provided in the region of the upper point of separation E and the lower point of separation E" of the individual sliding portions 1 and 2. The stop device substantially consists of notches or grooves 8, 8' or 9, 9' respectively which are arranged on the inside on the sliding portion 1 or 2, that is, on the side facing the individual segment portion 30, and also stop elements R, R' provided on the surface of the individual segment portions 30 and formed in a spring-elastic manner. The individual stop element R or R', which is arranged on the surface in the segment portion 30, has two tongues 28, 28', which are arranged in a recess of the wall of the segment portion 30 not denoted in greater detail, with cams 29, 29'. The tongues 28, 28' are formed in a spring-elastic manner so as to be capable of deflection substantially radially inwards and engage into the notches 8, 8' or 9, 9' respectively of the corresponding sliding portion 1 or 2, as a result of the inherent, spring-elastic restoring force, in a certain position of the sliding portions 1 or 2, as represented in Figure 5 in the cut-out.

The stop devices, substantially formed of the tongues 28, 28' and cams 29, 29' on the segment portion 30, and also of the notches 8, 8'; 9, 9' on the sliding portions 1, 2, are formed and arranged such that each individual sliding portion 1, 2 is engaged with at least one stop device and in the case of adjustment along the parallels of latitude - in this connection the tongues 28, 28' are pressed slightly radially inwards - becomes engaged with the next stop device. A movement of adjustment along the meridians is then only possible if the sliding portions 1, 2 is (sic) congruent with the segment portions of the two spherical bodies 4, 3.

In Figure 4, the combination toy 150 is represented in the partly cut-open state and there can be seen the sliding portions 1 and 2 and also the stop elements R which are arranged distributed over the outer periphery in the cut part, are diagrammatically represented and are arranged above the outer sphere 3.

Claims

1. Combination toy (150) having several segment portions, which are subdivided into parallel of latitude and meridian sectional planes and are
5 operatively connected with correspondingly associated and formed holding and connecting elements, and sliding portions (1, 2) which are arranged thereon and can be adjusted with respect to each other for the purpose of
10 occupying a certain position on the spherical body surface along the individual parallels of latitude and also in the direction of the meridians, characterised by a first, inner spherical body (6), a second, central spherical body (4), a third, outer spherical body (3)
15 and the sliding portions (1, 2) which are arranged on the outer spherical body (3) in an adjustable manner, wherein
- the central spherical body (4) and also the outer spherical body (3) are subdivided, in each case,
20 into an equal number of segment portions (14, 30) and, for the purpose of effecting the movement of adjustment oriented in the meridional direction relative to the inner spherical body (6), are operatively connected to each other by means of corresponding holding and connecting elements (5,
25 31); and
 - the individual segment portions (30) of the outer spherical body (3) are provided on their exterior with pockets (40) which are arranged spaced apart
30 from each other and in the assembled state form guide-tracks on the surface of the outer spherical body (3), which guide-tracks are oriented in the peripheral direction and in which there are guided the sliding portions (1, 2) which are adjustable along the parallels of latitude.
- 35 2. Combination toy according to claim 1, characterised in that the inner spherical body (6) is formed as a one-piece hollow body for receiving, in a form-closing manner, the central spherical body (4),
40 formed from the segment portions (14), and also the outer spherical body (3) formed from the segment portions (30).
- 45 3. Combination toy according to claim 1 or 2, characterised in that the individual segment portions (14) are formed in the shape of a spherical shell and can be joined together by means of correspondingly formed connecting elements (5), which engage in a form-closing manner, as a central spherical body (4).
- 50 4. Combination toy according to one of the claims 1 to 3, characterised in that the individual segment portions (30) forming the outer spherical body (3) are formed in the shape of a spherical shell and are secured to the individual segment portions (14) of the central spherical body (4) in a detachable manner by means of stop elements (31) which act with snap action.



5. Combination toy according to one of the claims 1 to 3, characterised in that the individual segment portion (14) is provided on both sides with groove (15, 15') oriented parallel to the outer contour and cross-piece (16, 16') and the connecting element (5) is provided with cross-piece (19, 19') engaging into the groove (15, 15') for the purposes of form-closing engagement.

6. Combination toy according to claim 5, characterised in that the connecting element (5) is formed in a semicircular manner and so as to be T-shaped in profile cross section and is provided on part of its periphery with at least one stop element (25, 25') which engages in the assembled state into an incision (18, 18') of the segment portion (14), formed in a notch-like manner.

7. Combination toy according to one of the claims 1 to 6, characterised in that the inner spherical body (6) is formed as one structural unit with the central and outer spherical bodies (4, 3) formed from the individual segment portions (14, 30) connected to each other in a form-closing manner.

8. Combination toy according to claim 1, characterised in that the individual segment portions (30) of the outer spherical body (3) is (sic) provided, on the side facing the sliding portions (1, 2), with pockets (40) which are arranged spaced apart from each other and form in the assembled state guide-tracks which are substantially self-contained and are oriented in the direction of the parallels of latitude.

9. Combination toy according to claim 1 or 8, characterised in that the individual sliding portion (1, 2) on the side facing the outer spherical body (3) has, in each case, two guide elements (13, 13') which are arranged spaced apart from each other and engage into the pockets (40) of the segment portions (30) in a form-closing manner.

10. Combination toy according to claim 9, characterised in that the guide element (13, 13') pre-formed on the sliding portion (1, 2) is formed in an L-shaped manner in profile cross section and engages in a form-closing manner with the larger cross-piece-like section into the pocket (40) of the individual segment portion (30).

11. Combination toy according to claim 1, characterised in that the sliding portions (1, 2) are provided with notches (8, 8'; 9, 9') on the inside and are engaged with a stop device, which is arranged on the segment portions (30) of the spherical body (3) and is formed substantially of tongues (28, 28') with cams (29, 29') such that the sliding portions (1, 2) can be adjusted against the restoring force of the portions (28, 28'; 29, 29') acting in a spring-elastic manner, engaging into the notches (8, 8'; 9, 9'), from the one



to the other segment portion (30) in the direction of the parallels of latitude.

- 5 12. Combination toy according to one of the claims 1 to 11, characterised in that the individual portions are produced from plastics material in the injection-moulding process.

