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TITLE OF THE INVENTION

CONNECTION STRUCTURE FOR COMPONENTS FOR TOY

BACKGROUND OF THE INVENTION

This invention relates to a toy constructed by coupling a plurality of components to each other to provide a single form, and more particularly to a connection structure for components for an assembled toy which is adapted to detachably connect the components to each other to provide the toy with any desired form.

There is generally known a toy which is so constructed that at least some of a plurality of components each having a predetermined form which are detachably connected to each other are suitably assembled into an article of another form. In such an assembled toy, the components each are provided with a connection mechanism which permits detachable connection between the components. Such a connection mechanism which has been known in the art is constituted of a projection of a spherical shape made of iron and formed on one of each two components in a manner to project therefrom, a receiving recess formed at the other component for receiving the spherical projection therein, and a magnet arranged in the receiving recess by way example. The spherical projections of the components each are magnetically attracted to the magnet arranged in the receiving recess of the component associated therewith, so that a plurality of the components may be selectively detachably coupled together as desired. Also, the connection mechanism permits such detachable coupling to be highly facilitated and the spherical projection attracted to the magnet to be pivotally moved in all directions.

Such conventional coupling between the spherical projection and the receiving recess is caused to be varied depending on a magnitude of magnetic force of the magnet. Thus, a reduction in magnetic force of the magnet fails to properly maintain positional relationship between the components, resulting in failing to permit a form of the toy assembled to be retained. In order to ensure positive coupling between the spherical projection and the receiving recess, it is required to increase magnetic force of the magnet. Unfortunately, this leads to an increase in cost of the toy. Also, an increase in magnetic

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force of the magnet does not permit the coupling due to attraction force of the magnet to be enhanced correspondingly.

SUMMARY OF THE INVENTION

The present invention has been made in view of the foregoing disadvantage of the prior art.

Accordingly, it is an object of the present invention to provide a connection structure for components for a toy which is capable of ensuring firm coupling between the components without deteriorating advantages due to magnetic coupling.

In accordance with the present invention, a connection structure for components for a toy which permits the components to be selectively combined with each other and coupled to each other therethrough to provide the toy with a predetermined form is provided. The connection structure includes at least one connection section provided on each of the components and constructed so as to permit each of the components to be interchangeably connected to at least one of the remaining components therethrough. The connection sections each are made of a material selected from the group consisting of a magnetic material and a non-magnetic material. The connection sections include first connection sections each made of a magnetic material and provided in the form of a spherical element in a manner to project from a surface of the component, second connection sections each adapted to be coupled to the first connection section by magnetic force, and third connection sections each adapted to be pressedly fitted on the first connection section. The components each are provided with at least one of the first, second and third connections.

In a preferred embodiment of the present invention, the third connection section is constructed so as to exhibit elasticity and in the form of a recess which is fitted on the first connection section.

In a preferred embodiment of the present invention, the components include components formed in imitation of limbs of an object selected from the group consisting of an animal and a doll and a component formed in imitation of a body of the object. The connection sections are arranged at joints of the object.

In a preferred embodiment of the present invention, the

components include a main component constituting a main part of the predetermined form and auxiliary components attached to the main component. The main component is provided thereon with at least one third connection section.

In a preferred embodiment of the present invention, the connection structure further includes engagement means arranged in proximity to the first connection sections and third connection sections in a manner to be engageable with each other when the components are coupled to each other.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and many of the attendant advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings; wherein:

Fig. 1 is a perspective view showing an assembled toy to which an embodiment of a connection structure according to the present invention may be applied by way of example;

Fig. 2 is an exploded perspective view of the toy shown in Fig. 1;

Fig. 3A is a side elevation view showing an essential part of a third connection section provided a body member of the toy shown in Fig. 1 which constitutes a part of a connection structure according to the present invention;

Fig. 3B is a plan view showing connection between the body member of Fig. 3A and another component;

Fig. 4 is a perspective view showing a shoulder member which is a part of the toy of Fig. 1;

Fig. 5 is a perspective view showing an assembled toy to which another embodiment of a connection structure according to the present invention may be applied by way of example;

Fig. 6 is a fragmentary exploded side elevation view of the toy shown in Fig. 5;

Fig. 7 is a perspective view showing a form of a toy assembled by suitably selectively combining components of the toys shown in Figs. 1 and 5; and

Fig. 8 is a perspective view showing another form of a toy assembled by suitably selectively combining components of the

toys shown in Figs. 1 and 5.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Now, a connection structure for components for a toy according to the present invention will be described hereinafter with reference to the accompanying drawings.

Referring first to Figs. 1 and 2, an embodiment of a connection structure for components for an assembled toy according to the present invention is illustrated. An assembled toy is constituted of a plurality of components. More particularly, the assembled toy to which a connection structure of the illustrated embodiment is applied, as shown in Fig. 2, generally includes a head member 1, a body member 2, shoulder members 3, leg members 4 and wing members 5 which are components of the toy. The components are selectively combined with each other and coupled together through the connection structure of the illustrated embodiment, to thereby provide the toy with a form in imitation of a bird.

The components each are provided with at least one connection section which permits the component to be coupled to another one of the components therethrough. In the illustrated embodiment, the connection sections are classified into three types. One is a first connection section a which is made of a magnetic material such as iron or the like so as to be attracted to a magnet and is provided in the form of a spherical element 6 on each of the head member 1, shoulder members 3, leg members 4 and wing members 5 in a manner to project from a surface thereof. Another one is a second connection section b which is provided on each of surfaces of each of the shoulder members 3 and adapted to be coupled to the first connection section a or spherical element 6 by magnetic force. The other one is a third connection section c provided on each of predetermined portions of the body member 2. The third connection section c is adapted to be pressedly fitted on the spherical element 6 of the first connection section a, to thereby be coupled thereto. The third connection section c is made of a non-magnetic material.

The first connection section a is integrally formed on an end of a shaft section 7 projectedly provided on each of a neck section of the head member 1, an end of a base section of each of

the leg members 4, one surface of each of the shoulder members 3 and a base section of each of the wing members 5. The shaft section 7 may be fixed on each of the head member 1, foot members 4, shoulder members 3 and wing members 5. Alternatively, it may be pivotally mounted on a body of each of the members 2 to 5. The first connection section a of the head member 1 is pivotally connected to a head body 1a of the head member 1 and the first connection section a of each of the leg members 4 is vertically pivotally connected to a leg body 4a of the leg member 4. Also, the foot members 4 each include a foot portion 4b and a toe portion 4c. The toe portion 4c is vertically pivotally connected to the foot portion 4b.

The second connection section b is arranged in the form of a recess on each of five surfaces of each of the shoulder members 3. The recess is provided on a bottom thereof with a magnet 8. The shoulder members 3 each are formed into a parallelopiped shape. Thus, it will be noted that the shoulder member 3 is provided on each of all surfaces thereof with either the connection section a or the second connection section b.

The third connection section c is formed inside a circular opening provided on each of a front end and both sides of the body member 2. The third connection section c is provided in the form of a cylindrical recess 9 somewhat smaller in diameter than the spherical element 6. The third connection section c, as shown in Fig. 3A, has cutouts 10 formed on a peripheral edge of an open end thereof in a manner to be spaced from each other at predetermined intervals. Such arrangement of the cutouts 10 permits a portion 11 of the third connection section c interposedly positioned between each adjacent two cutouts 10 to be deflected, resulting in the third connection section c exhibiting elasticity. The interposed portions 11 of the third connection section c each are formed at a distal end thereof with a pawl 12 inwardly bent.

The first connection section a is coupled to the second connection section b by magnetic force. Also, coupling between the first connection section a and the third connection section c is carried out by pressedly fitting the first connection section a into the third connection section c.

The components are provided at a portion thereof in proximity to the first connection section a and second connection section b with engagement means, which are constructed so as to be engageable with each other during coupling of the components. More specifically, the shoulder members 3 each are provided around a portion thereof in proximity to the first connection section 1 with four engagement pawls 13 in a manner to be spaced from each other at equal intervals, as shown in Figs. 3B and 4. Correspondingly, as shown in Figs. 3A and 3B, the body member 2 is provided around a portion thereof in proximity to the third connection section c with eight engagement grooves 14 in a manner to be spaced from each other at equal intervals.

Now, assembling of the components into a toy of such a bird-like form as shown in Fig. 1 by means of the connection structure of the illustrated embodiment constructed as described above will be described. First of all, the first connection section a or spherical element 6 of each of the shoulder members 3 is pressedly fitted in the third connection section c of the body member 2, to thereby attain coupling between the shoulder members 3 and the body member 2. In this instance, the engagement pawls 13 of the shoulder member 3 are engaged with the engagement grooves 14 of the body member 2 as shown in Fig. 3B. Then, the first connection sections a of the leg members 4 and wing members 5 are coupled to the second connection sections b of the shoulder members 3 by magnetic force. Thereafter, the first connection sections a of the leg members 4 and wing members 5 are coupled to the second connection sections b of the shoulder members 3 by magnetic force. Finally, the first connection section a of the head member 1 is pressedly fitted in the third connection section c provided on the front end of the body member 2, resulting in coupling between both members 1 and 2 being attained.

Thus, the connection structure of the illustrated embodiment permits the shoulder members 3 to be connected to the body member 2 through coupling between the first connection sections a and the third connection sections c. The coupling is attained by pressedly fitting each of the first connection sections a in each of the third connection sections c. In this

instance, the first connection section a is fitted in the third connection section c in such a manner that a hemispherical portion of the spherical element 6 is pressedly contacted at a peripheral edge thereof with an inner surface of the cylindrical recess 9 of the third connection section c. This permits frictional force of an increased level to be produced between the first connection section a and the third connection section c, so that coupling force for connection between the body member 2 and the shoulder member 3 may be increased as compared with the magnetic force. Thus, when the wing members 5 and leg members 4 are connected to the shoulder members 3, such firm connection of the shoulder members 3 to the body member 2 effectively prevents the shoulder members 3 from dangling or drooping from the body member 2 due to weight of the other members because the shoulder members 3 are firmly connected to the body member 3. This permits the form thus provided to be satisfactorily maintained.

Also, the first connection section a, second connection section b and third connection section c do not make a form of each of the body member 2 and shoulder members 3. Rather, the sections tend to interfere with or deteriorate the form. In this respect, the illustrated embodiment is so constructed that the connection sections are pressedly fittedly engaged with each other to keep the components 2 and 3 substantially close to each other. This permits the connection sections to be out of sight, to thereby improve an appearance of the toy thus assembled.

Also, when press fitting of the first connection section a in the third connection section c permits the body member 2 and shoulder member 3 to be kept close to or abutted against each other, so that the engagement pawls 13 of the first connection section a of each of the shoulder members 3 may be engaged with the engagement grooves 14 of the third connection section c of the body member 2. This effectively prevents the shoulder member 3 from being rotated relatively to the body member 2. The third connection section c, as described above, is formed with the pawls 12, which function to prevent the first connection section a or spherical element 6 from being readily detached from the third connection section c after fitting between both connection sections a and c.

Further, the first connection section a, as noted from the above, is arranged at the joint of each of the head member 1, shoulder members 3 and leg members 4, so that the head, leg and wing members may be freely moved as desired, resulting in any desired form being obtained.

Referring now to Figs. 5 and 6, another embodiment of a connection structure for components for an assembled toy according to the present invention is illustrated. An assembled toy to which a connection structure of the illustrated embodiment is applied, as shown in Fig. 5, generally includes a head member 15, a front member body 16, a rear body member 17 and rear leg member 18 which are components of the toy. The components are selectively combined with each other and coupled together to provide the toy with a form in imitation of a four-footed animal such as a leopard.

The components each are provided with at least one connection section which permits the component to be coupled to another one of the components therethrough. The connection sections of the components include a first connection section a, a second connection section b and a third connection section c as in the embodiment described above, as well as a connection section 19 for connecting a rear end of the front body member 16 and a front end of the rear body member 17 to each other. The first connection section a, second connection section and third connection section d may be constructed in substantially the same manner as those in the above-described embodiment, so that the components of the assembled toy to which the illustrated embodiment is applied may be interchangeable with those of the assembled toy described above with reference to Fig. 1. Thus, any suitable combination between the components of the assembled toys to which the above-described embodiments are applied provides any desired form different from the original forms of the assembled toys.

For example, a form shown in Fig. 7 may be obtained by vertically connecting the first connection section a and second connection section b of the two shoulder members 3 of the toy of the bird-like form to each other, to thereby provide a body constituted of the shoulder members 3 thus vertically connected,

connecting the first connection section a of the head member 15 of the toy of the animal-like form to the second connection section b of upper one of the vertically-connected shoulder members 3 described above, and connecting the first connection section a of the leg member 4 of the toy of the bird-like form and the first connection section a of the rear leg member 18 of the toy of the animal-like form to the second connection sections b of the vertically-connected shoulder members 3. Also, a form shown in Fig. 8 may be obtained by connecting the first connection section a of the rear body member 17 of the toy of the animal-like form onto the second connection section b of the shoulder member 3 of the toy of the bird-like form to provide a body, connecting the first connection section a of the head member 15 of the toy of the animal-like form to the second connection section b of the rear body member 17, and connecting the first connection section a of the rear leg member 18 of the toy of the animal-like form to the second connection section b of the above-described shoulder member 3.

The above-described forms each are provided by connection between the first connection section a and the second connection section b. Also, other forms each may be provided by connecting the first connection section a of any other component suitably selected to the third connection section c. In general, as described above, components constituting an assembled toy in imitation of a bird, an animal, a doll, a robot or the like include a main component constituting a central section of a form and accessory or auxiliary components. A lot of such auxiliary components are typically attached or connected to the main component, therefore, at least one third connection section c described above is desirably arranged on the main component.

Thus, the components each are provided thereon with at least one of the first connection section a, second connection section b and third connection section c. An increase in the number of the connection sections on each of the components permits a combination between the components to be diversified.

As can be seen form the foregoing, the connection structure of the present invention permits the components of the toy to be connected to each other through coupling between the

first connection section and the second connection section by magnetic force, so that detachable connection between the components may be highly facilitated. Also, another connection between the components is carried out by press fitting between the first connection section and the third connection section. In this instance, the spherical element constituting the first connection section is pressedly contacted at the peripheral edge thereof with the inner surface of the third connection section, to thereby substantially increase frictional force generated therebetween as compared with the magnetic force described above. Thus, this effectively prevents horizontal connection of two components to each other from causing one component to dangle by weight of the other component, so that the two components connected may be kept at predetermined positional relationship.

Also, the connection sections per se do not constitute a form of each of the components. Rather, the connection sections tend to deteriorate the form. However, the present invention is so constructed that the connection sections are pressedly fittedly engaged with each other to keep the components substantially close to each other. This permits the connection sections to be out of sight, to thereby improve an appearance of the toy thus assembled.

In addition, in the connection structure of the present invention, the third connection section may be constructed so as to exhibit elasticity and arranged in the form of a recess which is fitted on said first connection section. Such construction of the third connection section effectively prevents any damage to the third connection section due to fitting of the first connection section in the third connection section.

Further, the components may include components formed in imitation of limbs of an object selected from the group consisting of an animal and a doll and a component formed in imitation of a body of said object, wherein the connection sections are arranged at joints of the object. Such construction permits the head member, leg members and wing members to be freely moved as desired, to thereby provide any desired form.

Furthermore, the components may include a main component constituting a main part of the predetermined form and auxiliary

components attached to the main component, wherein the main component is provided thereon with at least one such third connection section. This permits any desired auxiliary components to be positively held on the main component.

Moreover, the connection structure of the present invention may further include engagement means arranged in proximity to the first connection sections and third connection sections in a manner to be engageable with each other when the components are coupled to each other. This significantly permits connection between the components to be attained with increased strength.

While preferred embodiments of the invention have been described with a certain degree of particularity with reference to the accompanying drawings, obvious modifications and variations are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is Claimed is:

1. A connection structure for components for a toy which permits the components to be selectively combined with each other and coupled to each other therethrough, to thereby provide the toy with a predetermined form, comprising:

at least one connection section provided on each of said components and constructed so as to permit each of said components to be interchangeably connected to at least one of the remaining components therethrough;

said connection sections each being made of a material selected from the group consisting of a magnetic material and a non-magnetic material;

said connection sections including first connection sections each made of a magnetic material and provided in the form of a spherical element in a manner to project from a surface of said component, second connection sections each adapted to be coupled to said first connection section by magnetic force, and third connection sections each adapted to be pressedly fitted on said first connection section;

said components each being provided with at least one of said first, second and third connections.

2. A connection structure as defined in claim 1, wherein said third connection section is constructed so as to exhibit elasticity and in the form of a recess which is fitted on said first connection section.

3. A connection structure as defined in claim 1, wherein said components include components formed in imitation of limbs of an object selected from the group consisting of an animal and a doll and a component formed in imitation of a body of said object; and

said connection sections are arranged at joints of said object.

4. A connection structure as defined in claim 1, wherein said components include a main component constituting a main part of said predetermined form and auxiliary components attached to said main component;

said main component being provided thereon with at least one said third connection section.



5. A connection structure as defined in claim 1, further comprising engagement means arranged in proximity to said first connection sections and third connection sections in a manner to be engageable with each other when said components are coupled to each other.