

ERRATUM

SPECIFICATION NO 2094166A

Page 2, line 74, *after* plug 16. *Start new paragraph insert* New claims or amendments to claims filed on 7 June 1982

Superseded claims 1 to 4

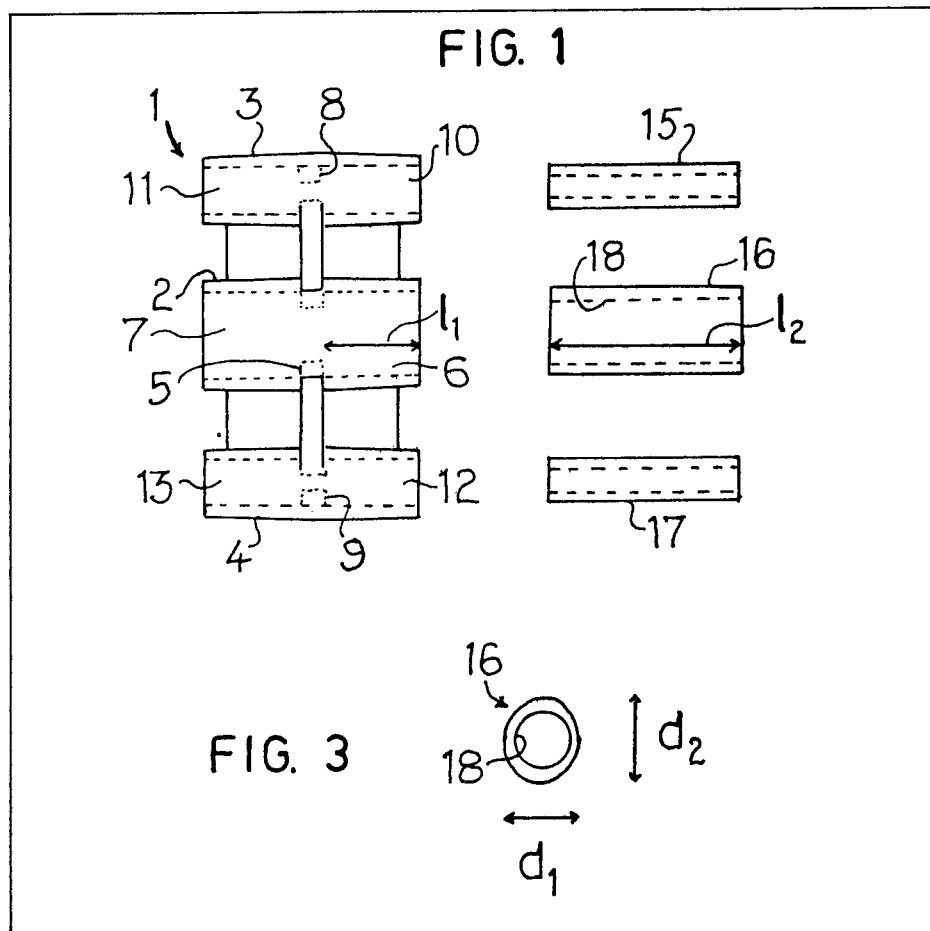
New or amended claims:-

1. A toy system comprising at least two components each provided with at least one socket having rigid side walls, and at least one elongate tubular plug manually insertable into, and removable from, the sockets for releasably connecting said at least two components together, the or each plug having a length greater than each of said sockets and a transverse cross-section, perpendicular to the elongate direction, such that the plug, when in a substantially undeformed condition, cannot easily be manually fully inserted into any of the said sockets, the or each plug being manually resiliently deformable out of the said undeformed condition by the application of pressure on opposed side surfaces of the plug to enable the plug to be fully manually inserted into any one of said sockets, the said rigid side walls of said any one socket being dimensioned to maintain the said resiliently-deforming pressure applied to the said opposed side surfaces of the, or one of the, plug(s), when the latter is fully inserted into the socket, to releasably retain the plug captive in the socket, wherein the or each plug has a non-uniform wall thickness and, when in the undeformed condition, has a substantially circular cylindrical bore and an outer surface having an at least substantially elliptical transverse cross-section perpendicular to the elongate direction.
2. A toy system according to claim 1, in which the or each plug is made from a plastics material.
3. A toy system according to claim 2, in which the or each plug is made from low density polyethylene.
4. A toy system according to any of the preceding claims, in which the said rigid side walls defining each socket are made of a material harder than that of the or each plug.
5. A toy system according to claim 4, in which each of said components provided with at least one socket comprises a plastics material, for example polypropylene or ABS (acrylonitrile-butadiene-styrene) resin, or a metallic material.
6. A toy system according to any of the preceding claims, in which the or each plug has a length approximately twice that of each socket.
7. A toy system according to any of the preceding claims, in which said rigid side walls defining at least one of the sockets includes a tapering mouth portion into which the or each plug, when in the undeformed condition, is inserted, the side walls of the said tapering mouth portion serving to apply the said resiliently-deforming pressure to the said opposed side surfaces of the plug as the latter is manually inserted fully into the socket.
8. A toy system according to claim 7, in which the mouth portion comprises a frusto-conical portion.
9. A toy system according to any of the preceding claims, in which at least one of said components constitutes a separate toy and at least one other of said components is an accessory for the said separate toy.
10. A toy system according to any of the preceding claims, in which the or each plug has an endless circumferential surface.
11. A toy system constructed and arranged substantially as herein described with reference to Figures 1 to 4 of the accompanying drawing.
12. An elongate tubular plug for a toy system according to claim 1, the elongate tubular plug being constructed and arranged substantially as herein described with reference to Figures 1 and 3 of the accompanying drawing.

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(54) Toy building system

(57) Plugs 15-17 can fit in the bores 10,6,12 or 11,7,13 respectively. The plugs have elliptical cross-sections and have to be deformed by manual pressure before they can be positioned in the bores. The resilience of the plugs holds them in position.



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FIG. 1

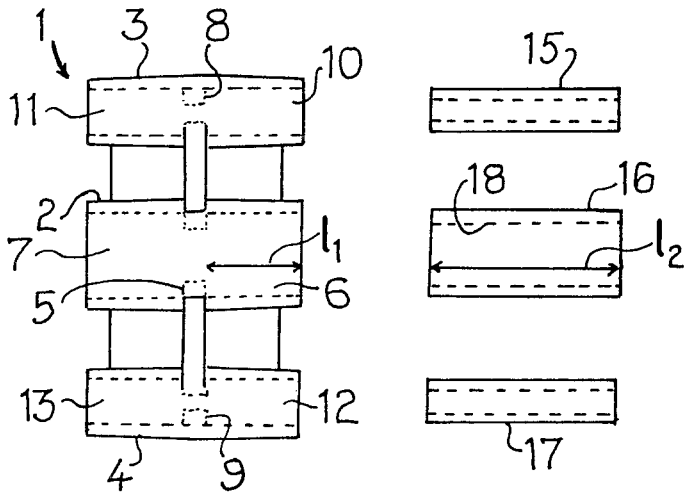


FIG. 2

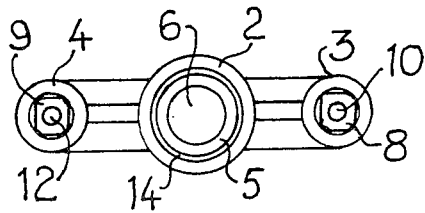


FIG. 3

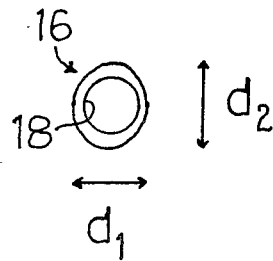
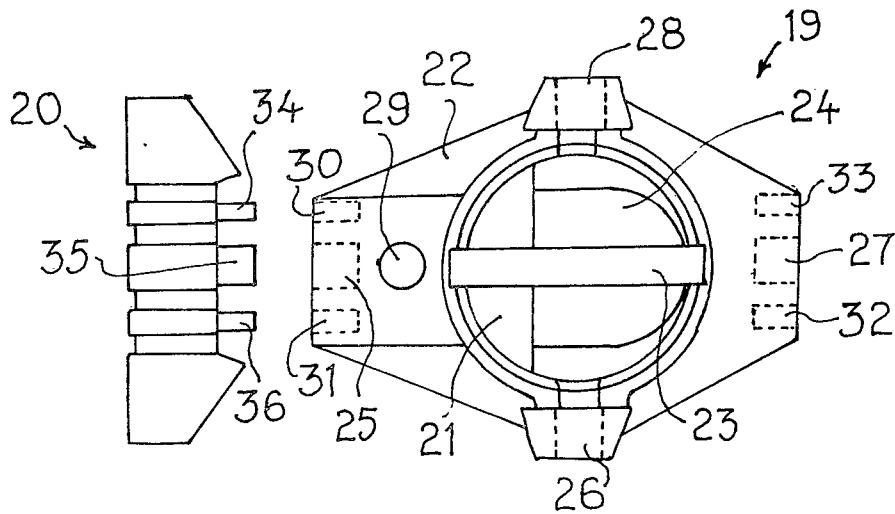


FIG. 4



SPECIFICATION

Improvements in or relating to a toy system

5 This invention relates to a toy system.

According to the invention a toy system comprises at least two components each provided with at least one socket having rigid side walls, and at least one elongate tubular plug manually insertable into, and removable from, the sockets for releasably connecting said at least two components together, the or each plug having a length greater than each of said sockets and a transverse cross-section, perpendicular to the elongate direction, such that the plug, when in a substantially undeformed condition, cannot easily be manually fully inserted into any of the said sockets, the or each plug being manually resiliently deformable out of the said undeformed condition by the application of pressure on opposed side surfaces of the plug to enable the plug to be fully manually inserted into any one of said sockets, the said rigid side walls of said any one socket being dimensioned to maintain the said resiliently-deforming pressure applied to the said opposed side surfaces of the, or one of the, plug(s), when the latter is fully inserted into the socket, to releasably retain the plug captive in the socket.

Conveniently, the or each tubular plug, when in the undeformed condition, has a cylindrical (although not circular-cylindrical) outer surface and has a greater side-to-side dimension in a first axial plane than in a second axial plane. Typically the or each plug, when in the undeformed condition, has an at least substantially elliptical transverse cross-section perpendicular to the elongate direction, the said first axial plane defining the major axis of said elliptical transverse cross-section. Suitably the or each tubular plug, when in the undeformed condition, has a circular cylindrical bore, the wall thickness of the plug in said first axial plane being greater than the wall thickness of the plug in the second axial plane.

Typically the or each plug is made, e.g. moulded, from a plastics material such as low density polyethylene. The said rigid side walls defining each socket are made of a material harder than that of the or each plug, for example a metallic material such as a die cast zinc alloy, or a plastics material, such as polypropylene or ABS (acrylonitrile-butadiene-styrene) resin.

Prefereably the or each plug has a length approximately twice that of each socket.

The said rigid side walls defining at least one of the sockets may include a tapering mouth portion into which the or each plug, when in the undeformed condition, can be partially inserted, the side walls of the said tapering mouth portion serving to apply the said resiliently-deforming pressure to the said opposed side surfaces of the plug as the latter is manually inserted fully into the socket. Conveniently, the mouth portion includes or consists of a frusto-conical portion.

A toy system according to the invention suitably comprises at least one component which, by itself, constitutes a separate toy, e.g. a space vehicle, and a

plurality of other components at least one of which is an accessory, e.g. a fin member, or space gun, for the said separate toy.

The invention will now be described, by way of example, with reference to the accompanying drawing, in which:-

Figure 1 is a plan of a part of one embodiment of a toy system according to the invention,

Figure 2 is an end view of a component of the toy system shown in *Figure 1*,

Figure 3 is an end view of an elongate tubular plug of the toy system shown in *Figure 1*, and

Figure 4 is another embodiment of a toy system according to the invention.

Figures 1 and 2 show a moulded ABS connecting element 1 comprising a central tubular portion 2 and outer tubular portions 3 and 4 integrally connected to the portion 2. The central tubular portion 2 has an internal annular shoulder 5 formed midway along its length, the internal side walls of the tubular portion 2 and the shoulder 5 defining a pair of equally-sized sockets 6, 7, each of length l_1 , opening into opposite ends of the connecting element 1. Each of the outer tubular elements 3 (4) also has an internal annular shoulder 8 (9) formed midway along its length, the internal side walls of the tubular element 3 (4) and the shoulder 8 (9) defining a pair of equally-sized sockets 10, 11 (12, 13), each of length l_1 , opening into opposite ends of the connecting element 1.

The sockets 6 and 7 are of generally circular cylindrical form having a diameter D and each having an enlarged mouth portion 14. Each of the sockets 10 to 13 tapers inwardly, is of smaller cross-section than the sockets 6, 7 and has flat side surface portions.

Elongate tubular plugs 15-17, moulded from low density polyethylene resin, are manually insertable into the set of sockets 10, 6 and 12 (or 11, 7 and 13), respectively, and each have a length l_2 satisfying the relationship $l_1 > l_2 \leq 2l_1$. The plugs 15 and 17 are of a similar circular cylindrical shape and are releasably push fitted in their respective sockets 10 (11) and 12 (13).

The elongate tubular plug 16, on the other hand, when not inserted in its associated socket 6 (7) has an undeformed non-circular cylindrical outer surface with a bore 18 of circular form. The plug 16, in transverse cross-section perpendicular to the elongate direction, has a substantially elliptical shape having a maximum dimension d_2 along its major axis and a minimum dimension d_1 perpendicular to the major axis. Preferably the dimensions of the plug 16 are such that

$$d_1 < D \leq d_2.$$

When the above relationship is satisfied the plug 16 cannot be fully inserted into its associated socket 6 (7) without being deformed. However, because the plug is of tubular form and is made of a material which is not hard, the plug is resiliently deformable on the application of pressure on opposed side surfaces of the plug 16. Such pressure can be

applied, to resiliently deform the plug 16, by locating the plug in the mouth portion 14 of the socket 6 (7) and manually pushing the plug 16 into the socket.

Since the walls of the socket 6 (7) are made of a comparatively hard material compared with the material of the plug 16, the side walls of the socket 6 (7) apply a resiliently-deforming pressure to the side walls of the plug 16 as the latter is manually pushed into the socket 6 (7) thereby causing the dimension d_2 to decrease and the dimension d_1 to increase. When the plug 16 is fully inserted into the socket 6 (7), the side walls of the socket maintain the resiliently-deforming pressure applied to the side walls of the plug 16 and counteract the tendency of the plug 16 to assume its original "elliptical", undeformed condition so that the plug 16 is releasably retained captive in the socket 6 (7). The plug 16 is easily manually removable from the socket 6 (7) and, once removed, substantially re-assumes its undeformed condition. If after much use the plug 16 does not return to its "elliptical" form it can easily be manually manipulated back into its original "elliptical" form.

Typically the plug 16 has a through bore diameter of 0.312 inch, dimension d_1 of 0.410 inch and a d_2 of 0.445 inch. Conveniently the socket 6 (7) has a diameter D of 0.436 inch.

Figure 4 shows a toy system according to the invention incorporating a space vehicle 19, having a spherical member 21 rotatably mounted in a surrounding frame 22, and a metallic fin element 20. The spherical member 21 has a tyre 23 secured around its circumference and has an internal seat 24 mounted therein to be gravity biased so as always to adopt a generally upright position. The frame has a plurality of sockets 25 to 29, each of similar dimension to the previously described sockets 6 and 7, and a plurality of sockets 30 to 33, each similar dimension to the previously described sockets 10 to 13. The fin element 20 incorporates sockets (not shown) similarly dimensioned and spaced relative to each other as the sockets 6, 7, 10 to 13 in the connecting element 1. Plugs 34 to 36 (corresponding to the plugs 15 to 17, respectively, in Figure 1) are removably manually inserted into the fin element 20 and are manually insertable into the sockets 30, 25 and 31, respectively, to removably connect the fin element 20 to the space vehicle 19. It will be appreciated that other components can be added to the toy system. For example the fin element 20 could be connected to the space vehicle 19 via the intermediary of connecting element 1 and plugs 15 to 17. Alternatively other components (not shown), such as accessory elements, e.g. space platforms or guns, could be removably connected to the space vehicle 19.

In other embodiments of the invention, (not shown), the socket 6 (7) may be provided with a frusto-conical portion between its mouth 14 and its circular cylindrical portion, the largest diameter of the frusto-conical portion being greater than the dimension d_1 .

It should be realised that although desirable for the plug 16 to be of non-circular cylindrical form (and preferably to be of "elliptical" form with a circular cylindrical through bore 18), such a form is not

essential. For example the plug 16 could have a "waisted" or "Figure of 8" transverse cross-section so as to be readily resiliently deformable.

Finally it should be observed that in certain applications of a toy system according to the invention the plugs 15 and 17 need not be employed for connecting two components together. If the plugs 15 and 17 are employed they need not be of the same length as the plug 16.

75 CLAIMS

1. A toy system comprising at least two components each provided with at least one socket having rigid side walls, and at least one elongate tubular plug manually insertable into, and removable from, the sockets for releasably connecting said at least two components together, the or each plug having a length greater than each of said sockets and a transverse cross-section, perpendicular to the elongate direction, such that the plug, when in a substantially undeformed condition, cannot easily be manually fully inserted into any of the said sockets, the or each plug being manually resiliently deformable out of the said undeformed condition by the application of pressure on opposed side surfaces of the plug to enable the plug to be fully manually inserted into any one of said sockets, the said rigid side walls of said any one socket being dimensioned to maintain the said resiliently-deforming pressure applied to the said opposed side surfaces of the, or one of the, plug(s), when the latter is fully inserted into the socket, to releasably retain the plug captive in the socket.

2. A toy system according to claim 1, in which the or each tubular plug, when in the undeformed condition, has a non-circular cylindrical outer surface and has a greater side-to-side dimension in a first axial plane than in a second axial plane.

3. A toy system according to claim 2, in which the or each plug, when in the undeformed condition, has an at least substantially elliptical transverse cross-section perpendicular to the elongate direction, the said first axial plane defining the major axis of said elliptical transverse cross-section.

4. A toy system according to claim 2 or 3, in which the or each tubular plug, when in the undeformed condition, has a circular cylindrical bore, the wall thickness of the plug in said first axial plane being greater than the wall thickness of the plug in the second axial plane.

5. A toy system according to any of the preceding claims, in which the or each plug is made from a plastics material.

6. A toy system according to claim 5, in which the or each plug is made from low density polyethylene.

7. A toy system according to any of the preceding claims, in which the said rigid side walls defining each socket are made of a material harder than that of the or each plug.

8. A toy system according to claim 7, in which each of said components provided with at least one socket comprises a plastics material, for example polypropylene or ABS (acrylonitrile-butadiene-

styrene) resin, or a metallic material.

9. A toy system according to any of the preceding claims, in which the or each plug has a length approximately twice that of each socket.

5 10. A toy system according to any of the preceding claims, in which said rigid side walls defining at last one of the sockets includes a tapering mouth portion into which the or each plug, when in the undeformed condition, is inserted, the side walls of
10 the said tapering mouth portion serving to apply the said resiliently-deforming pressure to the said opposed side surfaces of the plug as the latter is manually inserted fully into the pocket.

11. A toy system according to claim 10, in which
15 the mouth portion comprises a frusto-conical portion.

12. A toy system according to any of the preceding claims, in which at least one of said components constitutes a separate toy and at least one
20 other of said components is an accessory for the said separate toy.

13. A toy system according to any of the preceding claims, in which the or each plug has an endless circumferential surface.

25 14. A toy system constructed and arranged substantially as herein described with reference to the accompanying drawing.

15. An elongate tubular plug for a toy system according to claim 1, the elongate tubular plug being
30 constructed and arranged substantially as herein described with reference to Figures 1 and 3 of the accompanying drawing.