PATENT SPECIFICATION

673,362

Date of Application and filing Complete Specification : Oct. 27, 1948.

No. 27931/48.

Complete Specification Published : June 4, 1952.

Index at acceptance :— **Class 132(iii),** S6(ax:d), S6e1(a:b), S6ex.

COMPLETE SPECIFICATION.

Improvements in or relating to Structural Toy Kits.

I, WERNER KOBLER, of Huttenstrasse 42, Zurich, Switzerland, a Swiss Citizen, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement :—

This invention relates to improvements in structural toy kits comprising a plurality of rod elements of different length and coupling means or clamps for interconnecting the said rods.

Structural toy kits of the kind described are known in the art, but have the disadvantage, from a structural point of view, that rods which do not run in the same direction, are superposed when interconnected, i.e., that their axes do not intersect.

Such disadvantage is avoided by the assembly kit according to the present invention which comprises a plurality of base elements or rods of various lengths and having recesses disposed at a substantial distance from the rod-ends, the portion of the rods adjacent said recesses having the same thickness, and clamping means adapted to be engaged in the said recesses for the purpose of rigidly but disconnectably interconnecting two or more rods, the said clamping means being so adapted that the axes of the interconnected rods are disposed in a common plane.

Several forms of the components of a kit according to the invention are shown, as examples, in the accompanying drawings in which :

Fig. 1 shows a rod element;

Fig. 2 shows a first form of clamp in perspective view;

Fig. 3 shows a partially disassembled perspective view of a juncture involving six rod members;

Figs. 4 4*a*, 4*b* and 5 show modified clamps;

Figs. 6, 7 show a view and cross-section of a clamp adapted as lateral juncture or branch;

Fig. 8 shows a further clamp for lateral connections to both sides of a rod member;

Figs. 9, 10 show a clamp in form of a longitudinally slotted spring sleeve, in longitudinal section and cross-section respectively;

Figs. 11 and 12 show a further form of clamp in elevation and partial section respectively;

Fig. 13 shows an elevation or plan of a juncture involving an axle box;

Fig. 14 shows a perspective view of such axle box;

Fig. 15 shows a longitudinal section of two coupled clamps;

Fig. 16 shows a perspective view of an axle box mounted on a rod member;

Figs. 17-21 shows views and cross-sections of rod members having different forms of terminal grooves.

The rod member 1 in Fig. 1 is of circular cross-section, but also may be of any other suitable cross-section such as polygonal, and is provided on its end-portions with recesses in the form of circular grooves 2. The said recesses are spaced from the rod ends so that the remaining end-portions still have substantial length. The structural toy kit comprises rod members 1 of various lengths, which must be interconnected when erecting toy structures of any kind desired. To such end, clamps are provided, of which Fig. 2 shows a first form. Such clamp comprises two plates 3 and 4, the marginal portions 5 of which are bent off at right angles toward each other. The plates 3 and 4 may be rectangular in shape as shown in the drawings or they may be triangular in shape. Four semi-circular recesses 6 are provided in the marginal portions 5 so as to be engaged in the circular grooves 2

of the rod members 1. The design is such that the centre lines of four interconnected rod members intersect each other in a common point. The said plates 3, 4 are interconnected by means of a screw 7 so as to form a box-like structure. The diameter of the head 8 of screw 7 suitably equals that of the rods 1, and the diameter of the screw shank suitably equals that of the rod member at the point of groove 2. Such a screw 7 may be used for connecting a further clamp 9 to the clamp 10 (Fig. 3). By screwing a pin 11—one end of which is provided with inside threads, and the other end with a circular groove 2— on to the end of the screw 7, a further clamp 12 may be connected to the pin 11, i.e., rod members extending in six directions may be interconnected so that their axes intersect in one common point.

In the example set out in Fig. 4, the marginal portions of the two clamping-plates are cut off at 13, laterally of the recesses 6, so as to permit to introduce the rod ends laterally between the said plates. In the example shown in Fig. 5, the corners of the bent-off marginal portion 5 are cut off similarly for the same purpose.

The clamp shown in the Figs. 4*a*, 4*b* differs from that shown in Fig. 2 in that it comprises only two recesses for co-axially connecting two rod members 1 and the width of the plates 3^1, 4^1 corresponds approximately to the diameter of the rod members.

In Fig. 6 a clip 15 is used for securing secondary rod members 17 to a rod member 15^1 at a point intermediate of its ends. In such a clip, the marginal portions of the clamping-plates are provided with two opposite recesses 14 for passing the rod 15^1 therethrough and with further recesses 16 for retaining the secondary rods 17. Fig. 8 shows a form of clamp adapted to connect secondary rods on both sides of a rod member 15^1.

The said recesses 16 (Fig. 7) also could be omitted from the clamping-plates, thus affording any angular deflection desired for the secondary rods with respect to the said rod member 15^1.

A simple form of clamp is shown in Figs. 9 and 10, comprising a longitudinally slotted sleeve 18 into which one end of the rods 19 to be interconnected are plugged, said sleeve comprising inside snugs 20 which project into recesses 21 of the rods.

In Figs. 11 and 12, clamps 22 are shown, the plates of which are circular and comprise in their bent-off marginal portions recesses which are angularly spaced at 45° each for interconnecting, e.g., eight radially disposed rod members. The said recesses also could be omitted so as not to limit the angular deflection of the rods clamped between the plate edges to the said 45°. When further rod members are to be connected at right angles to the said radial rods, such may be done by means of the screw 7, on the threaded end of which a pin 11—similar to that of Fig. 3—is screwed, and a further clamp 23 is secured to the said pin. The head of the screw is provided with a circular groove, as shown in Fig. 13, for engaging the clamping-plates of a further clamp 24.

Should it be desired to incorporate a bearing in the toy structure built up of the rods, an axle box 25 having threaded radial bores 26 is used, as shown in Figs. 13 and 14. Screws 27 having circumferentially grooved heads, are engageable in the said bores, the said heads being held, in the manner described above, between the plates of the clamps 29 or 30.

A simple form for interconnecting two clamps is shown in Fig. 15, in which an interconnecting link comprises a small rod having an annular groove 29^1 and terminal collars 30^1. The marginal portions of two clamps 31, 31^1 are engageable in the groove 29^1.

Fig. 16 shows a stirrup 34^1 clamped to a rod 32 by means of a locating-screw 33, an axle box 25 as shown in Fig. 14 being secured to the said stirrup.

Instead of providing an annular groove 2 in the end-portions of the rods 1, the recesses also could be formed by grooves 34 (Figs. 17, 18) extending at right angles to the rod axis or by notches 35 (Figs. 19, 20) or by transversal bores 36 (Fig. 21), in which correspondingly adapted lugs or snugs provided on the edge of the clamp are engageable.

A structural toy kit comprising a plurality of rods and clamps as described, affords a great number and variety of readily disconnectible connections.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A structural toy kit comprising a plurality of base elements or rods of various lengths and having recesses disposed at a substantial distance from the rod-ends, the portion of the rods adjacent said recesses having the same thickness, and clamping means adapted to be engaged in the said recesses for the purpose of rigidly but disconnectably interconnecting two or more rods, the said clamping means being so adapted that the axes of the interconnected rods are disposed in a common plane.

2. A kit as claimed in Claim 1, wherein the clamping means comprises two clamp-

ing plates each, the latter being provided with snugs for engaging the rod recesses.

3. A kit as claimed in Claim 2, in which the said clamping-plates comprise an edge each bent off at right angles toward each other for the purpose of engaging the recesses of the rods, the said plates constituting a box-like structure held together by screw means.

4. A kit as claimed in Claim 3, wherein the clamping-plates are of rectangular basic form.

5. A kit as claimed in Claim 3, wherein the clamping-plates are of triangular basic form.

6. A kit as claimed in Claim 3, wherein the clamping-plates are of circular basic form.

7. A kit as claimed in Claim 3, comprising rods of circular cross-section, rod recesses formed by annular grooves, and semi-circular recesses provided in the edge of the clamping-plates and adapted to engage the rods through their annular grooves.

8. A kit as claimed in Claim 7, wherein the clamping-plates are provided with further recesses aside of those for receiving the rod ends, for permitting to introduce the rods laterally into the rod-receiving recesses.

9. A kit as claimed in Claim 3, further comprising clamping means for connecting further rods at right angles to the rods engaged between the clamping-plates, such further clamping means co-acting with the said screw-means.

10. A kit as claimed in Claim 1, in which the clamping means are formed as a resilient sleeve which has inside projections engageable in the recesses of the rods plugged into the sleeve.

11. A kit as claimed in Claim 1, in which a coupling rod is provided for interconnecting two clamping means, which rod is provided at both ends with a collar and with an annular groove intermediary of the two collars, the rod portion, intermediary of said collars, being disposed in recesses of two clamping means.

12. A kit as claimed in Claim 1, further comprising a tubular bearing-block member into which rods are insertable and which on its circumference comprises threaded bores, screws each having a head provided with an annular groove and adapted to be screwed into the said bores, and clamping means co-acting with said annular grooves.

13. A kit as claimed in Claim 1, in which the rod end-portions comprise opposite grooves disposed at right angles to the rod axes.

14. A kit as claimed in Claim 1, in which the recesses are formed by notches in the rod end-portions.

15. A kit as claimed in Claim 1, in which the recesses are formed by holes in the rod end-portions, which holes extend at right angles to the rod axes.

16. A kit as claimed in Claim 1, in which the rods are of polygonal cross-section.

17. A kit as claimed in Claim 3, wherein the clamping-means comprises, aside of the portions engageable in the rod recesses, oppositely arranged recesses in which a rod is engageable to permit to establish branches springing from a rod.

18. A kit as claimed in Claim 3, in which the rods are of circular cross-section and the screw has a head of a diameter equalizing that of the rods.

19. A kit as claimed in Claim 3 in which the screw has a head provided with an annular groove.

20. A kit as claimed in Claim 3, in which one end of a rod is provided with a threaded bore for engagement with the screw.

21. In a structural toy set, a rod joint constructed and arranged substantially as described with reference to Fig. 3 or 13 of the accompanying drawings.

Dated this 27th day of October, 1948.

WERNER KOBLER.

Per:
BOULT, WADE & TENNANT,
111-112, Hatton Garden,
London, E.C.1.
Chartered Patent Agents.

Printed for Her Majesty's Stationery Office by Wickes & Andrews, Ltd., E.C.4. 39/244.—1952
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

FIG.1

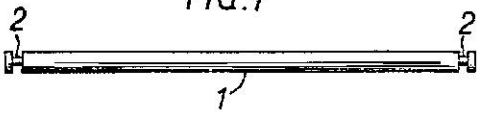
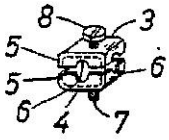


FIG.2



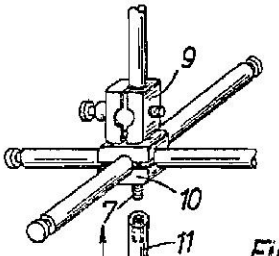


FIG.3

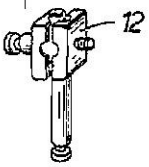


FIG 4a

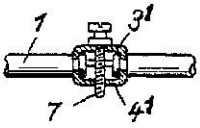


FIG 4b

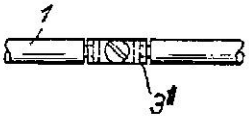
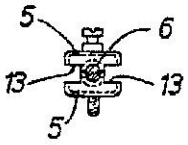


FIG.4



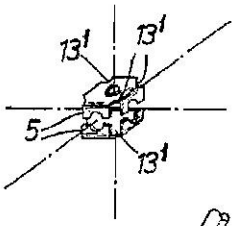


FIG.5

FIG.6

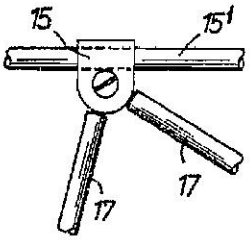
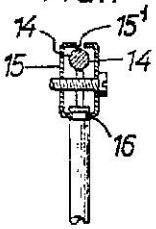


FIG.7



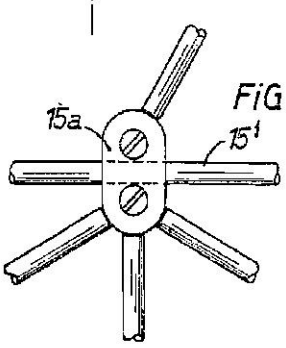


FIG.8

FIG.9

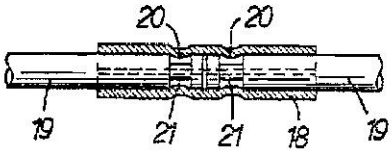
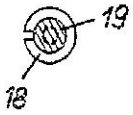


FIG.10



673,362 COMPLETE SPECIFICATION
2 SHEETS

This drawing is a reproduction of the Original on a reduced scale.

SHEETS 1 & 2

FIG.11

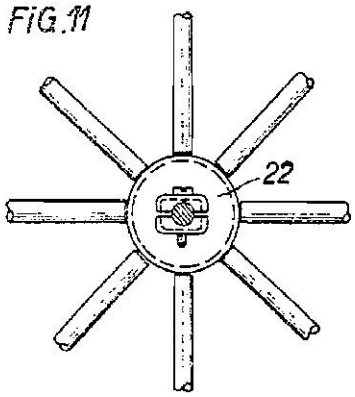


FIG.12

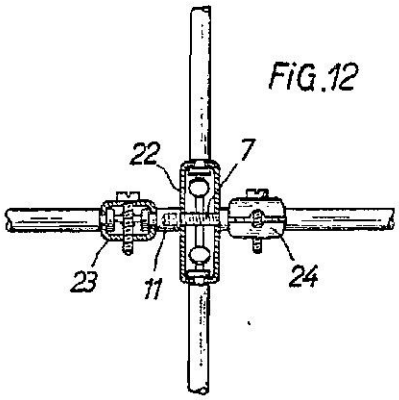


FIG.3

FIG.13

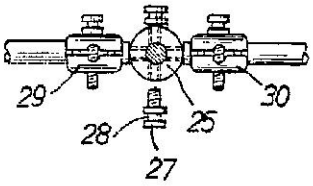


FIG.14

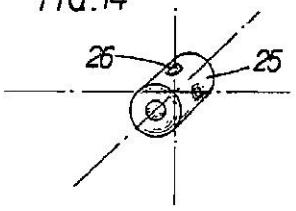


FIG.5

FIG.15

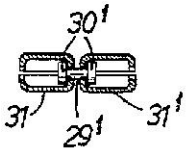


FIG.16

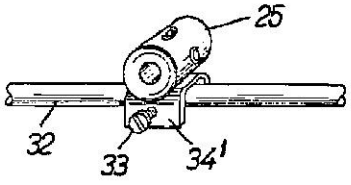


FIG.8

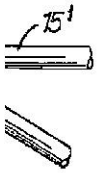


FIG.17

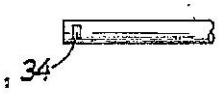


FIG.18

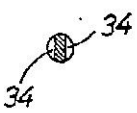


FIG.19

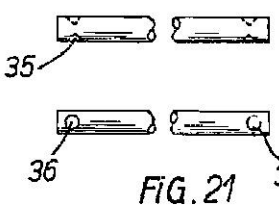


FIG.20

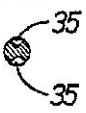


FIG.21

673,362 COMPLETE SPECIFICATION

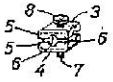
2 SHEETS

This drawing is a reproduction of the Original on a reduced scale.

SHEETS 1 & 2

FIG.1

FIG.2



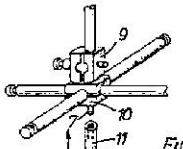


FIG.3

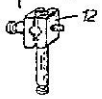


FIG 4a

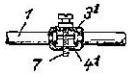


FIG 4b

FIG.4

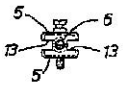


FIG.5

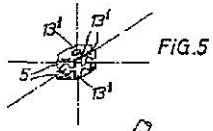


FIG.6

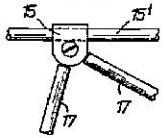


FIG.7

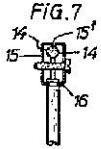


FIG.8

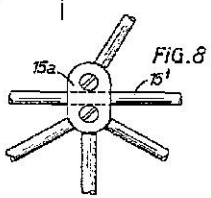


FIG.9

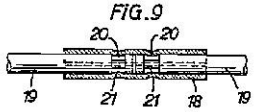


FIG.10

FIG.11

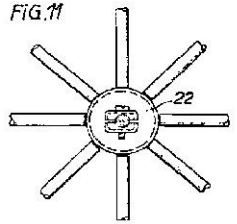


FIG.12

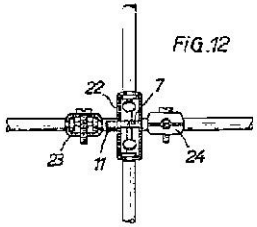


FIG.13

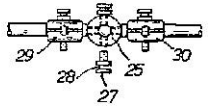


FIG.14

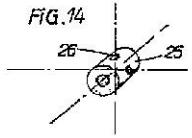


FIG.15

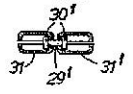


FIG.16

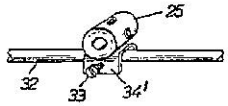


FIG.17

FIG.18

FIG.19

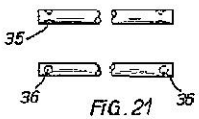


FIG.20

FIG.21