ABSTRACT
A construction game system having cube-shaped corner pieces and construction rods of equal cross section, which comprises construction rods and corner pieces including side faces, the side faces of theconstruction rods and of the corner pieces have parallel disposed, dovetail shaped grooves, the corner pieces and the construction rods define a hollow space of substantially square cross section between the end faces. Further construction elements are provided as connection, fortification, and holding-members, the members are equipped with one of the same grooves and projections. At least one connecting member has such cross section that it is at least partly insertable into the hollow spaces of the corner pieces and of the construction rods and are lockable by means of holding members.

15 Claims, 5 Drawing Figures
The present invention relates to a construction game system with cube shaped corner pieces and construction rods of equal cross section, connectable therewith.

In the construction game disclosed in the German publication No. 1,006,768 (Auslegeschrift), the corner pieces are equipped at all six side faces and the construction rods at their end faces with bores, into which pegs can be inserted for a mutual connection. The comparatively low rigidity and stability is a drawback in this construction game, which low rigidity and stability is caused by the small cross section of the pegs, and does not permit the construction of objects of large dimensions.

On the other hand, for instance by the German publication No. 1,164,296 (Auslegeschrift), a construction rod has been known, which has at its four longitudinal sides undercut grooves, into which thickened ends of ribs or ledges of other parts can lock. However, limits are set for the use, since it is not possible to combine a plurality of construction rods to a joint larger beam.

It is one object of the present invention, to provide a construction game system, which due to its manifold and extremely rigid connection possibilities provides the presumption to imitate construction works and technical devices also at a large scale.

It is another object of the present invention, to provide a construction game system, wherein not only the construction rods, but also the corner pieces are equipped at their side faces with parallel directed preferably dovetail-shaped grooves, such that the corner pieces and the construction rods define a hollow space preferably square in cross section, and extending between the end faces and also that further structural elements are provided as connecting members, stiffening members and holding members, which are equipped with the same grooves and/or corresponding projections, of which at least the connecting members have such cross section, that they are insertable completely or partly into the hollow spaces of the corner pieces and of the construction rods and are lockable therein by means of holding members.

As connecting members serve in accordance with the present invention center pieces, the length of which corresponds with those of the corner pieces and their cross section throughout corresponds with that of the hollow spaces and which are equipped at their end sides either with grooves or projections and in the central range of their side faces with crosswise passing longitudinal bores for the receiving of a wedge. Furthermore, the construction rods are equipped at their ends with a recess for an insertion of the center pieces in longitudinal direction and with a cross-opening for receiving the wedge. By this arrangement it is possible, to construct an individual long beam from individual construction rods and corner pieces or to release an individual construction rod of a combined beam, without requirement of disassembling the entire construction part.

As holding members serve, in accordance with the present invention, slides, the length of which is larger than the width and height of the center pieces and the cross section of which is designed as a double dovetail. These can thus enter into grooves from both sides in longitudinal direction.

A connecting and stiffening member, through which the range of application of the construction game system can be expanded, is characterized, in accordance with a further feature of the present invention, by a angularly shaped diagonal support consisting out of two halves, the legs of which carry projections at their free ends, by which they can be hooked into grooves of the construction rods and which have at the head position of their legs a peg slidable into the hollow spaces of the corner pieces and of the construction rods and being equipped with a longitudinal bore.

A further extension of the game possibilities results in accordance with another feature of the present invention in the use of connecting members in form of plate-like pieces, consisting of flexible working material, which pieces have at least two oppositely disposed pointed side edges over profile ledges movable over film hinges, which are insertable into the grooves of the remaining parts.

The concept of the present invention can be further developed and complemented such, that all thinkable objects and fantasy structures can be produced, so that to the unfold ing of the creative forces of the child of all ages no limits are set. Thus the construction rods and the corner pieces are undercuts at their side edges such, that on each side face two projections separated from the groove disposed in the center are created.

By this arrangement it is possible to connect together the construction rods and corner pieces steplike set off laterally and to provide two center pieces with grooves next to each other.

In accordance with the further development of the present invention, the construction rods have in addition to their recess, serving the insertion of the center pieces in longitudinal direction, at the other three sides smaller recesses for an endside insertion thereininto. In order to render a sliding more difficult, the surfaces of the end sides of the construction rods and of the corner pieces are equipped with projections and recesses cooperating with each other.

A further solution is characterized by the fact, that at the base faces of the grooves of the construction rods, of the corner pieces and of the center pieces curved recess are provided on the crosswise disposed longitudinal bores of the center pieces. By this arrangement round rods and wheel axles can be inserted.

In order that the wheel axles equipped with a collar are secured and guided against axial displacement, in accordance with another feature of the present invention, recessed abutment faces perpendicular to the curved guides as provided.

A further solution resides in the fact, that as an additional connecting member, a smaller cube-shaped corner piece is provided, which rods. It is to be understood, that also a combination with the center piece is possible and thereby a combination of the small parts with the large parts.

In order to be able to use this small corner piece as carrier of a wheel axle and of a rod guide respectively, in accordance with another embodiment of the present invention, the corner piece is equipped with a passing-through bore.

With these and other objects in view, which will become apparent in the following detailed description, the present invention, which is shown by example only, will be clearly understood in connection with the accompanying drawings, in which:

FIG. 1 is an exploded perspective view of the most important parts of the construction game system;
FIG. 2 is a perspective view of a diagonal support serving as fortification member;
FIG. 3 is a schematic showing of a construction erected by means of the plate shaped ledges;
FIG. 4 is a perspective view of a plurality of individual parts joined together by example.
FIG. 5 is a schematic perspective view indicating a gable house;
FIG. 6 is an elevation of the endside of a corner piece;
FIG. 7 is a side elevation of a part of the construction rod;
FIG. 8 is a section along the lines III—III of FIG. 7;
FIGS. 9 and 10 are side elevations of respective center pieces with grooves and projections;
FIG. 11 is a section along the lines VI—VI of FIGS. 9 and 10;
FIGS. 12 and 13 are front and side elevations of the smaller corner piece; and
FIGS. 14 and 15 are front and side-elevations of a slide member.

Referring now to the drawings, the construction game system comprises a construction rod 1 and in addition to the construction rod 1 and a corner piece 5, the two center pieces 2 and 3 are the most important individual parts of the system.
The construction rod 1 has at both ends recesses 16 provided for the reception on both ends of the center pieces 2 and 3 with a cross bore 18 adapted to receive a wedge 17. Furthermore, in the side faces 19 of the construction rod are inserted longitudinally directed undercut, preferably dovetail-shaped grooves 7. On both sides of the longitudinal edges 20 are arranged further grooves 21.

The corner piece 5, the cross section of which coincides in the size of the face with that of the construction part 1, is designed as a cube has, as the construction rod 1, at its four peripheral side faces 6, likewise as the construction rod 1 undercut grooves 7. Between the end faces 8 extends a hollow chamber 9 square in cross section. In each end face 8 is disposed a recess 10 adjusted to the foot width of the grooves 7, whereby these recesses 10 are set-off relative to each other for 90°.

The center pieces 2 and 3 correspond as to their dimensions to the hollow space 9 of the corner piece 5. While the center piece 2 has likewise grooves 7 at the end faces 11, as the elements 1 and 5, the center piece 3 carries at the end faces 12 projections 15, complementary to the grooves 7, which projections 15 can be inserted into the grooves 7 of the other parts. In both center pieces 2 and 3 cross projecting longitudinal bores 13 are provided in the central range of the side faces 14.

The corner pieces and the construction rods have on each side face side lateral-most surfaces 5 feet and 1 feet, respectively, which are aligned in a flat plane and define therebetween the grooves 7. The corner pieces and the construction rods have on each end face end lateral-most surfaces 5 inches and 1 inches, respectively, which are aligned in a flat plane and define therebetween the hollow space 9 and the recess 16, respectively. In this manner of construction, the surfaces 5 feet, 1 feet, 5 inch and 1 inch of the corner pieces and construction rods define flat surfaced corner pieces and construction rods without projections, but simple inwardly cut recesses and hollow spaces.

Referring again to FIG. 1, in addition the slide 4 and the wedge 17 are disclosed, the function of which will be described below.

Details of the diagonal supports 23, consisting of two angularly shaped halves, result from FIG. 2. Accordingly the support halves carry at the free ends of their legs 24 projections 25, with which they can be hooked into the undercut grooves 7 of the construction rods 1, for which purpose the outermost edges 26 are adjusted, as to their cross section, to the undercut grooves 7. In the head point of the legs 24 are arranged pegs 27 to be inserted in the recesses 16 of the construction rods and to be inserted in the hollow spaces 9 of the corner pieces 5, respectively, and are equipped the same as the center pieces 2 and 3 with a longitudinal bore 13.

While with these individual parts described so far only connections can be obtained at a right angle, the connecting members 28 disclosed in FIG. 3 give the possibility to select any angle. The connecting members 28 consist thereby of a flexible working material and have at two oppositely disposed pointed side edges by means of film hinges 29 movable profile ledges 30, which can be inserted into the undercut grooves 7 of the construction rods 1. Thus, for instance, a woodwork can be formed by example. A further insert form of the connecting members 28 is given still for the formation of door or window-wings, which can be moved due to the film hinges 29.

FIG. 4 discloses how the above described parts can be combined, whereby a plurality of construction rods 1 and corner pieces 5 are joined with the remaining construction elements. At first a center piece 3 with its projection is inserted in one of the grooves 7 of the center pieces 2, and thereafter the center pieces 2 are inserted so far into the hollow space 9 of the corner pieces 5, and 5, until the grooves 7 project beyond the other end of the center pieces 5. The slides 4, and 4, are inserted into these grooves 7, which slides secure the center pieces 2 against removal, while disposed in the recesses 10 of the corner pieces 5. Finally, the prevailing construction rods 1, and 1, with their recesses 16 are mounted on the center pieces 3, and 3, and clamped by means of the wedges 17. In the present case, the two corner pieces 5, and 5, are laterally connected together by means of the slide 4. It is, however, likewise possible, to connect the construction rod 1, without cooperation of the corner piece 5, only by means of the corner piece 5, to the construction rod 1, by arranging instead of the slide 4, the projection of the center piece 3, disposed in the construction rod 1, into the groove of the center piece 2. The construction rods 1, and 1, form in this case jointly with the corner piece 5 a passing through larger beam.

In order to demonstrate that also to the side faces of the corner piece 5 structure can be added, in the shown embodiment the construction rod 1 is added to the corner piece 5, by means of the center piece 3, whereby the projection of the center piece 3, can slide into the groove of the corner piece 5. Instead of using the center piece 3, also a center piece 2 in connection with a slide 4 can be used. In the same manner, namely by means of a center piece 3 or a center piece 2 in combination with a slide it is possible also to build up on a side face 19 of the construction rod 3.

In case the faces created between the individual construction rods should be closed, wall plates 22 consisting of card boards for instance can be inserted into the grooves 21. It is thereby desirable that also in the side faces 6 of the corner pieces 5 such grooves 21 are provided.

It can be ascertained from FIG. 4, that for instance the production of frameworks is possible by connecting a construction rod 1 between the construction rods 1, and 1, forming a corner at 45° by means of a diagonal support 23. The projections 25 overlap with their outermost edges 26 the two construction rods 1 and 1, while the pins 27 are inserted into the construction rod 1, and are clamped by means of a wedge.

How an object can be imitated at a large scale is shown in FIG. 5, which shows a model of a gable house schematically. This can have a ground face of several square meters and comprises a plurality of correspondingly long construction rods 1, diagonal supports 23 and plates 28, which are held together in the above described manner by corner pieces 5 with the simultaneous use of center pieces 2, 3, slides 4 and wedges 17.

With the same means, likewise other structural works or other objects can be constructed, for instance usable buildings and furniture, usable bridges or the like, since the type of connection suffices for the occurring rigidity requirements in a measure, as it was not the case with the previously known games.

As it is recognizable from FIGS. 6 to 8, at the four edges of the corner pieces 5 and of the construction rods 1 grooves 21 are cut in. These grooves 21 have such shape that on all four side faces in addition to the already existing grooves 7, two projections 15 are created. On the ground faces of the grooves 7, of the corner pieces 5, of the construction rods 1 and of the center pieces 2 (FIG. 9) are arranged curved recesses 7a. The end sides of the corner pieces 5 are equipped with pointed shaped projections 8a, the end sides 8 of the construction rods are equipped with grooves 8b, in which the projections 8a engage, if the two parts are joined. In the shown embodiment only grooves extending parallel in one direction are provided. The grooves can, however, also be crossed at an angle of 90°.

In addition to the recess 16 provided at the upper side, the construction rod 1 has at the other three sides the smaller recesses 16a extending only up to base face of the groove 7, through which recesses 16a, the center pieces 3 can be inserted at the end face, also if the construction rods are joined already in the construction works. On the sides adjacent to the recess 16 extend the recesses 16a suitably up to the inner side of the cross bore 18 serving a wedge-connection. On the side opposite the recess 16 the recess 16a need not be provided, as corresponds with the width of the center piece 3. At the longitudinal bores 13 projecting crosswise the center pieces 2 and 3 are, as shown in FIGS. 9 and 10, curved guide faces 13a, which constitute parts of a cylindrical face. Perpendicular to
these guide faces are provided suitably circular abutment faces 13b on all sides plane and recessed. In the projections 15 of the center pieces 3 slots 15e limited by bores are provided in known manner, in order to bring about a resilient clamping between the parts to be connected. It is to be understood that also the projections 15 of the other parts (1,5) can be equipped with such slots. The smaller cube-shaped corner piece 5a (FIGS. 12 and 13) has an edge length, which corresponds with the width and the height of the center pieces 2 and 3. It has at three side faces grooves 7 and at the other three sides projections 15, which likewise can be equipped with slots. The grooves and projections are of equal size as all of the remaining parts (1, 2, 3, 5) of the system. The fastening bore 9a extends between two sides equipped with grooves.

FIGS. 14 and 15 show finally a slide member 4a which serves the purpose of connecting a longitudinal side of the center pieces 3, 2 with other parts of the system. This slide member has suitably the length of the center pieces 2 and 3 and is equipped with a projection 15 of dovetail shape and extending over the entire length. On the opposite side are provided two short dovetail halves 15b, laterally set off opposite each other, whereby the length of the side equipped with the dovetail halves corresponds with the length of the longitudinal bores 13, so that this side of the slide member can be inserted resiliently into a longitudinal bore of a center piece. One dovetail hook undercuts thereby the face of the longitudinal bore 13 in forward direction and the other hook in the rearward direction. Both hooks find room between the walls of the longitudinal bore and the curved guide 13a.

The construction game system can be supplemented still by such elements, which may render possible a joining at an angle, for instance angular pieces equipped with grooves and/or projections, in which one face forms an angle of 30° or 45°. As working material for the production of the individual parts, due to the low weight and the simple production by injection molding, thermoplastic working material would be most advantageous.

While I have disclosed several embodiments of the present invention, it is to be understood that these embodiments are given by example only and not in a limiting sense.

We claim:

1. A construction game system having cube-shaped corner pieces and construction rods of equal cross sections, comprising construction rods and corner pieces including side faces, said side faces of said construction rods and of said corner pieces having parallel disposed, dovetail-shaped grooves, said corner pieces and said construction rods defining a hollow space of substantially square cross section between the end faces, said corner pieces and said construction rods having on each side face side lateral-most surfaces aligned in a flat plane and defining therebetween said grooves, said corner pieces and said construction rods having on each end face end lateral-most surfaces aligned in a flat plane and defining therebetween said hollow spaces, further construction elements being provided as connection, fortification, and holding-members, said members being equipped with one of the same grooves and projections, and at least said connection members having such cross section that they are at least partly insertable into said hollow spaces of said corner pieces and of said construction elements and are lockable by means of holding members.

2. The construction game system, as set forth in claim 1, wherein said connection members comprise center pieces legs of which correspond with the length of said corner pieces and the cross section of which corresponds with that of said hollow space, and said center pieces are equipped at their end sides with one of grooves and projections and provided in the center range of their side faces with crosswise passing elongated bores adapted to receive a wedge.

3. The construction game system, as set forth in claim 1, wherein said construction rods have a recess at their ends for the longitudinal insertion of center pieces and have a cross bore for receiving a wedge member for clamping said center pieces.

4. The construction game system, as set forth in claim 1, wherein said holding members comprise slides, the length of which is greater than the width and height of center pieces, and the cross section of which is of double-dovetail shape, so that they can engage on both sides in longitudinal direction into said grooves.

5. The construction game system, as set forth in claim 1, wherein said corner pieces have in both end faces a passing through recess, adjusted to the foot width of said grooves, and serving the reception of a slide, and said recesses are set off relative to each other for 90°.

6. The construction game system, as set forth in claim 1, wherein said connection and fortification-members comprise an angularly shaped diagonal support consisting of at least two halves having legs carrying at the free ends projections, by means of which they can be hooked into said grooves of said construction elements and a peg having a elongated bore and being insertable into an apex joint of said legs as well as into said hollow spaces of said corner pieces and of said construction rod.

7. The construction game system, as set forth in claim 1, wherein further connection-members comprise plate-like pieces consisting of flexible material, and said last mentioned pieces have at least on two oppositely disposed pointed side edges profile ledges movable by means of film hinges, which are insertable into the grooves of the remaining parts.

8. The construction game system, as set forth in claim 1, wherein said construction rods and said corner pieces are undercut at their side edges such that on each side face two projections are created constituting said side lateral-most surfaces aligned in a flat plane and which are separated from said groove disposed in the center.

9. The construction game system, as set forth in claim 1, wherein said construction rods have, in addition to recesses serving for insertion of said center pieces, in longitudinal direction on their other three sides smaller recesses for the end side insertion.

10. The construction game system, as set forth in claim 8, wherein said side ends of said construction rods and corner pieces have a surface including cooperating grooves and projections for rendering more difficult a sliding thereon.

11. The construction game system, as set forth in claim 1, wherein curved recesses are provided on some faces of said grooves of said construction rods, of said corner pieces and of center pieces, and curved guides are arranged on crosswise disposed elongated bores of said center pieces.

12. The construction game system, as set forth in claim 11, which includes a plane, recessed and circular abutment faces are provided perpendicularly to said curved guides.

13. The construction game system, as set forth in claim 1, wherein an additional connection piece comprises a smaller cube-shaped corner member, the length of the edge of which corresponds with the width and height of center pieces, and
three of its side faces have a groove each and the other of its side faces have a projection.

14. The construction game system, as set forth in claim 13, wherein each of said corner piece has a passing through bore, the radius of which corresponds with that of said curved recesses and guides.

15. The construction game system, as set forth in claim 1, which includes a slide member, the length of which corresponds with that of center pieces and which has on one longitudinal side a passing through projection of dovetail formation and on the other longitudinal side has two short dovetail halves set off relative to each other, the length of said side equipped with said dovetail halves corresponding with the length of said longitudinal faces, in that said side of said slide member can be resiliently inserted into a longitudinal bore.

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