



159159

1

CONSTRUCTION SYSTEM

TECHNICAL FIELD

The construction system in this application refers to a toy modeling system and comprises of 3 primary elements that are able to connect in orientations that have not been utilized by manufacturers to the full extent. This system centers on the possibilities of diagonal connection of the construction elements and the need for inclusion of curvature based building blocks.

BACKGROUND ART

Past and present construction toys have shown straight stack and perpendicular means of connecting bricks and beams or columns. Little progress has been made to improve results in terms of a smooth finish or to get rid of sharp edges or unnecessary gaps. Another deficiency of past inventions is the inability to build a wall with curvature.

Olsen's US Pat. No. 5049104 exhibits a knuckle joint, which is a good step towards handling curves. But it would put a user into tight positions that impede the process of fastening the bolts or sometimes become unreachable. The finished model would itself exhibit lots of gaps due to lack of ideas that incorporate curvatures in building elements.

Marzetta's diagonal construction as stated in US App. 2009/0017716 is new and innovative, but the requirement for a diagonal beam or slab that also conforms to a rectilinear array is not a condition in many cases. Modeling enthusiasts would seek unobstructed building possibilities. Angles at which elements connect must be many, in order to bring about the closest depiction of a structure (real or imaginary).

J.Glickman (K'NEX) presents a multiple angled connector. The drawback of this device is that it allows connection at only certain angles. The unused options cannot be removed. Thus an element is used in a model where it does not need to be of that size. Having a construction element that does the job and not have excesses will naturally be small, by which finer aspects of a builder's thought can be featured.



G00001

SUMMARY OF THE INVENTION

The primary elements of this invention are beams, slabs and studs. In this description beams are referred as interconnecting beams. Connector eyes are also referred to as grooved eyes. Slabs

2

would represent surface area and beams would be their inter-connectors that also play the role of pillars in a building or strong points of a structure. It should be noted that slabs in this construction system would have a plurality in terms of length and width. Beams will be in a plurality of lengths but width will be a constant W .

A slab (20) is seen in Fig. 4 that shows (21) can be placed on top in a vertical position and pivoted having connector eye (22) as its axis. In Fig. 1, slabs (20) and (21) are to be understood as identical in dimensions. Such a diagonal and gapless alignment is achieved by the presence of the cylindrical end (23) of radius X and a concave depression (24) of similar radius X at the corresponding opposite end of slab (21). The pivotal range achieved by this invention is 140 degrees. The availability of the cleft (25) allows corner (26) of slab (21) to be received into slab (20).

The beam (27) is a derivative of the cross-section of the slab as seen in Fig. 3. In this construction system the structure of the beam would take a shape as that shown in Fig. 11 from a front view. A side view is shown in Fig. 10. The beam has a connector eye at each end lengthwise unlike the slab. The connector eyes have a horizontal distance of $W/2$ between them i.e. half the width W . Thus it also has the structure to connect end to end with beams regardless of lengths. Being a derivative of the slab, the pivotal properties apply in the same manner to the beams.

Connections would require the third element of this construction system, the connecting stud. When a first element needs to be connected to a second element, a stud that corresponds to the required pivot angle is chosen, for example a 40 degrees stud as shown in Fig. 7. This is one of 3 types of studs used in this construction system. It has a smooth extension on one side (29). The chosen stud will be inserted into the first element. The stud will be slid in with moderate friction and the rotation will be arrested by the grooves in both elements. When the stud is inserted to its limit the protruding half of the stud will provide the connecting means for the next element to be joined as pictured in Fig. 1, (28) is inserted through beam (27).

DESCRIPTION OF THE DRAWINGS

Slabs (20) and (21) are to be taken as identical in dimensions with reference to Fig. 1.

Perspective and side views of slabs are shown in Figs. 2 and 3 respectively. Length would mean

3

the distance from (30) to (31) and width would be the distance from (32) to (33).

A grooved eye (22) in Fig.1 is for the connecting stud and it will also be a feature on the corresponding opposite side of the slab.

Figs. 4, 5 and 6 are sectional diagrams that exhibit angular range.

Slab (21) could be pivoted to a maximum of 105 degrees as in Fig. 6 relative to position in Fig. 4. With reference to Fig. 4, slab (21) could also pivot counter-clockwise by 35 degrees to be positioned as shown in Fig. 5.

Interconnecting beams are denoted by (27), in Fig. 11 (front view) and in Fig. 10 (side view). A perspective view is depicted in Fig. 8.

Length of a beam is to be understood as the distance from (34) to (35) that are the centers of the respective connector eyes in Fig. 10.

Width will be a constant for all interconnecting beams and is indicated by the distance (47) to (48) as in Fig. 11.

Beam (27) has a grooved eye at each end that allows a second and a third element to be linked.

The perspective, front and side views of the connecting stud are shown in Fig. 7, 9 and 12 respectively.

From Fig. 13, the left half of the stud - from (38) to (40) – would be inside the first element that needs to be connected.

The grooves of the same stud in the second half from (41) to (42) are rotated having (43) as their axis in Fig. 12.

It is to be noted that each stud in this construction system is a single part and not twistable or flexible.

The rotated variance of section (41) to (42), relative to section (38) to (39) in Fig. 13 would determine the pivot of a second element that is to be joined.

The first element's countersunk eye will limit the stud at (39). This is shown in Figs. 9 and 13 by a stopper indicated by (44).

All slabs and interconnecting beams would have a countersunk characteristic (37) at each connecting eye as in Fig. 8. At the stud's maximum depth as in Fig. 1, (39) will be touching (37). In Figs. 7 and 12 a 40 degrees variant stud is shown with a factory impression of the number 40 on its tip for individual builder's identification.

Fig. 12 exhibits an X – ray view of the stud. The grooves marked (45) belong to the leading half of the stud. Grooves marked (46) are the trailing half.

4

Figs. 9, 13 and 14 show 3 types of studs. Fig. 9 exhibits a stud that can link 2 elements and determine their angle. Fig.13 exhibits a stud that can link an additional component without angular control. This is achieved by section (29) that slides into a component whereby grooves are not a feature. Fig. 14 exhibits a third type of stud that is able to link 4 elements.

The grooves of the stud in Fig.14 are an example of a straight connector as can be seen from the linear orientation of grooves marked (45) and (46).

Fig. 15 is an element of universal nature that can be used in unity with this construction system.

MODE FOR CARRYING OUT THE INVENTION

The construction system described can be an ideal build and play toy for kids above 8 years old. Even more so true for adults who enjoy modeling structures like popular landmarks around the world. As for kids it provides educational value, without doubt. By attempting features of a new modeling toy it brings out creative thinking and the toy becomes the avenue by which their thoughts are expressed. More elements of a universal nature as in Fig. 15 would be incorporated into the construction system.

INDUSTRIAL APPLICABILITY

The components of this construction system as shown in the drawings are all designed with the condition that they should be manufactured in a single step plastic injection molding process. A lot of revisions have been made to refrain from having any recess areas in individual components that can drive up per unit costs. Straight pull injection molding process is sufficient to complete the elements of this construction system.

CLAIMS

I claim,

1. A construction system of beams and slabs that has 3 primary elements, (a) slabs (b) beams and (c) studs. The elements (a) and (b) exhibit features that use curvatures for adjoining edges. Slabs would have a plurality in length and width. Beams would have a plurality in terms of length but, width (W) will be a constant. Studs would orientate and hold the different elements in a plurality of positions so long as a connector eye is available with each element that needs to be joined. The result will be a toy construction system that has the ability to connect the plurality of the components in a plurality of angles to model structures of interest.
2. A construction system as in claim 1, slabs would exhibit a cylindrical edge of radius X with a cleft along one side, and a concave depression defined by a similar radius X on the corresponding opposite edge. The cleft would be the receiving area for the edge of the concave side of the slab when pivoted positions of adjoining elements are above 35 degrees towards the cleft.
3. A construction system as in claim 2, slabs would exhibit a connector eye on each side of the cylindrical edge and, if the width of a slab permits, beyond the grooves of one connector eye will be a passageway of smooth (non-grooved) texture towards the grooves of the other eye.
4. A construction system as in claim 2, beams are a derivative of the cross-section of a slab and as such all characteristics stated would also apply to beams.
5. A beam as in claim 4, in addition would have a connector eye at each end of its length. The width of a beam at the tip would be only half the beams total width and that will be taken up by the grooves and countersunk allowance.
6. A construction system as in claim 3 and 5, the connector eye of the slab and beams will exhibit a similar orientation, shape and dimension when placed in an upright position. An upright position is to be taken as the length of the beam or slab in a vertical orientation.

6

7. A construction system as in claim 1, studs will be the fastener as well as the determinant of the pivoted angle of elements that are joined. The grooves of each half of the stud are rotated to provide different angular variations and thus the plurality of variations would mean a plurality of studs. The leading half of a stud is for orientation to a first element and the tailing half for determining the specific angle Y of the second element that is to join and the angle variation Y will be indicated by a factory impression on the tailing edge.
8. A construction system as in claim 7, a stud can exhibit extensions of a smooth texture beyond the grooves that would allow the particular stud to double penetrate and join a third or fourth element.
9. A construction system as in claim 7 a connecting stud would exhibit a stopper that can limit the penetration into a first element in conjunction with each connector eye's countersunk characteristic.