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PATENT SPECIFICATION



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170,549

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Complete Accepted: Jan. 5, 1922.

COMPLETE SPECIFICATION.

Improvements in or relating to Constructional Toys.

We, BING WERKE, vorm. GEBRUDER BING & KLIENGESELLSCHAFT, a German joint stock company, of Blumenstrasse 16, Nurnberg, Germany, 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 toy or educational building elements from which can be formed buildings having the proper constructional and structural appearance, such as bridges, towers, houses, slipways, elevators, etc., and also toys, carriages, furniture and the like.

According to the invention this is effected by the combination of a number of building elements some of which are in themselves novel. For the construction of girders, tie-beams, sleepers, bearers and other constructional parts which are subjected to pressure or to axial compression a lattice work girder of known construction made of flat strips is provided, such strip has triangular openings and two rows of holes on the sides. For the production of tension members, tension rods, shafts, etc., a round rod or tube is employed each end of which are provided with a screw thread and with an axial longitudinal slot corresponding to the gauge or thickness of the lattice work girder. The connection of the lattice work girder and the rod is effected by screwing or by means of a special joining member in the form of a tie-plate which has a circular and a triangular hole.

In addition to these elements we may also employ further known elements in the form of flat iron bars or plates drilled with a single row of holes, angle irons,

screws, drilled plates, rope pulleys, flanged wheels, rope-shackles, etc.

Our invention will be clearly understood from the following description aided by the annexed drawings which illustrate the elements separately and in combination with one another and in which

Figure 1 shows the lattice work girder in elevation.

Figure 2 the round rod or tube.

Figure 3 the connecting member.

Figure 4 a number of lattice-work girders joined together.

Figure 5 a lattice-work girder connected with round rods or tubes, and

Figure 6 the connection of round rods or tubes as spokes with a hub.

The known lattice-work girder (Figure 1) consists of a flat strip of metal or of any suitable material having openings or parts formed or stamped out in the form for example of triangles *a, a* with relatively equal sides the hypotenuses of which with their outer edges form together two longitudinal portions or bars *b, c* and the smaller sides of the triangles the oblique cross pieces *d*. The bars *b* and *c* are furnished with rows of holes. The distance between two holes *e, e* is equal to the perpendicular distance between the two series of holes so that two holes of the one row and the two oppositely situated holes in the other row lie in the corners of a square. This arrangement of the holes makes it possible not only to joint the lattice-work girders continuously in the same direction by screwing them together but also perpendicularly to one another constructively and in a stable form, so that rotary moments can also be transmitted without its being necessary to employ special joining

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plates. These lattice-work bars are made in various lengths for a box of building materials.

The round rod or tube *f* (Figure 2) is furnished at each end with a screw thread *g* and with a longitudinal slot *h* the width of which corresponds to the thickness of the lattice-work girder so that the end of the rod or moulding can be pushed over the one or the other longitudinal bars *b* or *c* of the lattice work girder and be firmly screwed by means of two nuts (Figure 5). The provision of the longitudinal slots on the ends of the rods or moulding *f* thus makes it possible to pass directly from the round to the flat system. The triangular openings in the lattice work girder serves in connection herewith for the reception of the nut likewise.

The connecting piece *e* (Figure 3) is in the form of a tie-plate having a hole *k* and a rectangular or triangular opening *l*. The hole *k* enables the tie-plate to be attached to a lattice-work girder by passing a screw or bolt through same and one of the holes in the lattice-work girder.

A rod or tube *f* may be attached to the tie-plate *i* by passing the slot over the portion *m* and fixing same by two nuts.

The connecting member *i* enables particularly the fixing of obliquely arranged tension members to be effected (see Figure 5) or the suspension of oscillating bodies, the screw or bolt in the hole *k* acting as a hinge.

Figure 4 shows the joining together of a number of lattice-work girders, in which a lattice-work girder *n* is connected parallel with a lattice work girder *o* and

this lattice work girder *o* with a perpendicular lattice-work girder *p* and an oblique lattice-work girder *r* by means of screws *s* and a plate *t*.

Figure 6 shows the employment of rods *f* forming the spokes and their connection with a wheel hub *u*, that has openings *v* for receiving the fastening nuts.

With the above described elements the most varied kinds of buildings having proper constructional and structural appearance such as bridges, towers, halls, slip-ways, elevators, *etc.*, can be made. In combination with the known elements moreover model toys, carriages, furniture, *etc.*, can also be built.

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

In toy or educational building materials employing lattice work girders made from flat strips having triangular openings and rows of holes, providing rods or tubes having a screw thread and longitudinal slots at each end and connecting members in the form of a tie-plate having holes and rectangular or triangular openings; for use in combination with said lattice-work girders, substantially as and for the purpose set forth.

Dated this 19th day of May, 1921.

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Fig. 1.

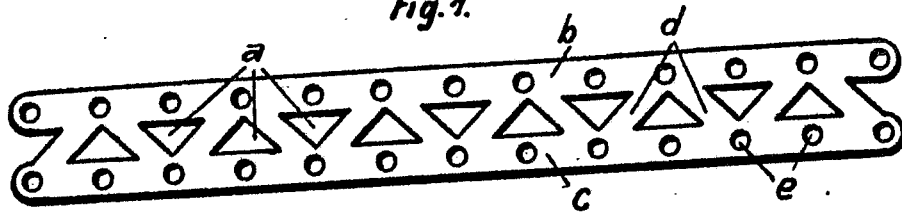


Fig. 2.

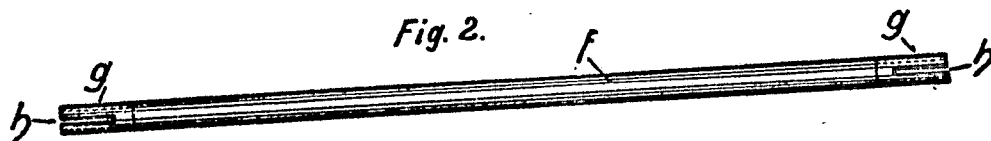


Fig. 3.

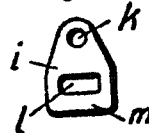


Fig. 4.

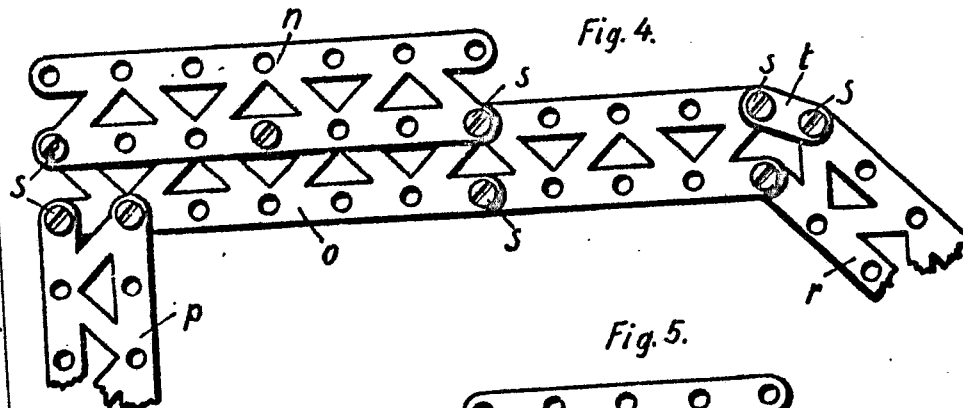


Fig. 5.

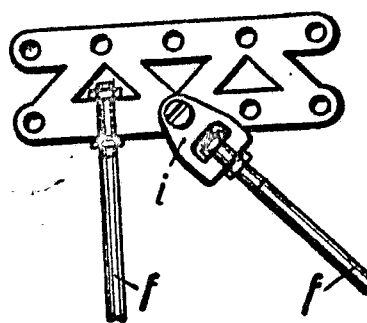
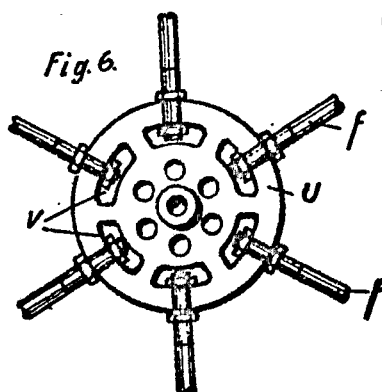


Fig. 6.



[This Drawing is a reproduction of the Original on a reduced scale]