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PATENT



SPECIFICATION

Application Date, June 15, 1917. No. 8574/17.

Complete Left, Dec. 14, 1917.

Complete Accepted, June 13, 1918.

PROVISIONAL SPECIFICATION.

An Improved Element for use in Building Constructional Toys or Models.

I, FRANK HORNBY, of Meccano Limited, of Binns Road, Old Swan, Liverpool, Engineer, do hereby declare the nature of this invention to be as follows:—

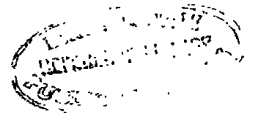
This invention relates to an improved part or element for use in the construction of toys or small engineering models adapted to be built up from interchangeable parts, such models being capable of being taken to pieces and the parts again utilised by being remade up into other toys or models, as required. It is desirable that the parts used in the construction of such toys should be available for fulfilling several functions in order that the number of parts required in an outfit for building a series of models should be minimised. The part or element forming the subject of the present invention is therefore capable of a variety of uses or functions.

According to this invention the part or element consists in its complete form of a lozenge shaped plate having a major axis considerably longer than the minor, say at least four times as long. The corners of the lozenge are provided with lugs perforated with a standard sized hole so as to be interchangeable and fit in with the other parts of the outfit. The lozenge shaped plate may be solid or apertures may be punched out therein so as to leave webs along the minor and major axes of the plate, and if desired in order to strengthen the plate its outer edges may be flanged, or the plate itself may be corrugated or ribbed longitudinally or transversely for this purpose. Where the plate is lightened so as to leave webs along the major and minor axes, a considerable amount of unperforated metal is left at the ends of the major axis, and in this metal other holes besides those at the extreme ends may be punched, such holes being preferably spaced apart to conform to the standard pitch of the perforations adopted in the other elements of the toy building system in which this part is to be used, and similarly the web of metal along the minor axis of the plate may be punched with holes, the pitch of which also conforms to the standard pitch of such holes obtaining in the system.

In the complete form of the element it is made up as a lozenge, the four outer edges of which are oblique to the major and minor axes. Modifications of this form may be provided by dividing the element along the major or minor axes so as to produce parts in the form of isosceles triangles, the base and equal sides of which are made of webs of metal, and a vertical web preferably passing from the base to the apex. In every case projections are preferably formed at the corners of the triangle in which the holes are punched, or the holes may be punched in the corners themselves.

In a further modification the plate when of lozenge formation is not provided with a web along the major axis, but only a transverse web across the minor axis. Any of these elements as described may be coupled together through the

[Price 6d.]



holes in their lugs with bolts and nuts to build up a strong type of braced structure such as the sides of model bridges, towers, platforms, observation posts, and standards generally, the triangular form of the elements serving to provide a flat finish along the side of the structure and acting as filling-in pieces.

With any of the forms described it is proposed to provide tie pieces consisting of plain bands having perforations at each end, by means of which the bands may be bolted to the plate elements and form tie members, and the ends of these bands in which are formed the perforations may be bent up at right angles.

Such an element forms an extremely light, yet rigid part and is very useful for building up various types of models.

In order to secure the feet of these elements to a bed plate or otherwise, a bracket piece may be provided consisting of a sole plate having an upstanding lug or lugs the sole plate and the lugs of this bracket piece being perforated so that they may be bolted down on a bed plate and to the perforated lugs of the elements respectively.

The part is stamped out in a single piece from sheet metal.

Dated this 14th day of June, 1917.

For the Applicant,

A. J. DAVIES,
Patent Agent,
37, Moorfields, Liverpool.

COMPLETE SPECIFICATION.

An Improved Element for use in Building Constructional Toys or Models.

I, FRANK HORNBY, of Meccano Ltd., Binns Road, Old Swan, Liverpool, Engineer, 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 an improved part or element for use in the construction of toys or small engineering models adapted to be built up from interchangeable separate parts, such models being capable of being taken to pieces and the parts again utilised by being remade up into other toys or models, as required. It is desirable that the parts used in the construction of such toys should be available for fulfilling several functions in order that the number of parts required in an outfit for building a series of models should be minimised. The part or element forming the subject of the present invention is therefore capable of a variety of uses or functions. Triangular sheet metal elements have been proposed for toy construction having open notches in their side edges for connecting the elements together by bolts and nuts, and cardboard or the like triangular pieces have also been proposed for building architectural models in which perforations were formed at the corners by means of which the pieces were connected together by pins or other fasteners, the triangular pieces being formed with a series of crossed ribs. Elements have also been proposed of symmetrical lozenge shape for use in building towers, bridges, or the like structures, such elements being made up of steel or bamboo tubes, bars or rods connected by socket pieces, the tubes or the like being disposed along the major and minor axes of the element and round its periphery, and eyes were formed at the corners for coupling the elements together, and such elements when in miniature were proposed for toy construction and were then made of any metal.

According to this invention the part or element consists in its complete form

of a symmetrical lozenge shaped plate having a major axis considerably longer than the minor axis. The corners of the lozenge are provided with lugs perforated with a standard sized hole so as to be interchangeable and fit in with the other parts of the outfit, the lugs permitting of several plates being assembled without the body of the plates proper overlapping. The lozenge shaped plate has apertures punched out therein so as to leave webs along the minor and major axes and round the periphery of the plate, and if desired in order to strengthen the plate its outer edges may be flanged, or the plate itself may be corrugated or ribbed longitudinally or transversely for this purpose. When the plate is lightened in this way, a considerable amount of unperforated metal is left at the ends of the major axis, and in this metal other holes besides those at the extreme ends may be punched, such holes being preferably spaced apart to conform to the standard pitch of the perforations adopted in the other elements of the toy building system in which this part is to be used, and similarly the web of metal along the minor axis of the plate may be punched with holes, the pitch of which also conforms to the standard pitch of such holes obtaining in the system. Various modifications of this arrangement may be made by dividing the elements along the major or minor axes so to produce parts in the form of isosceles triangles, the base and equal sides of which are made of webs of metal, a vertical web preferably passing from the base to the apex. In every case projections or lugs are formed at the corners of the triangular plates in which holes are punched. In a further modification, the plate when of lozenge formation, may not be provided with a web along the major axis, but only with a transverse web across the minor axis.

Elements in accordance with this invention are illustrated in the accompanying drawings, in which Fig. 1 shows the complete form of lozenge shaped plate element, Fig. 2 being a cross section on the line A—A of Fig. 1 showing a flanged construction of the webs. Figs. 3, 4, 5, and 6 show various modified constructions of the plate element, Fig. 7 being a cross section on the line B—B of Fig. 2 illustrating the longitudinal ribbing of the webs. Fig. 8 shows how the type of plate illustrated in Fig. 3 may be assembled to form a bridge girder, Fig. 9 showing the application of the same plate to the construction of a roof truss.

In carrying out the invention the element in its complete form, as shown in Figs. 1 and 2, comprises a lozenge shaped plate having webs 1, 2, along its major and minor axes respectively. The plate has a considerably longer major than minor axis, and the corners of the plate are provided with lugs 3 perforated with standard size holes 4 so as to be interchangeable and fit in with the remaining parts of an outfit. The lozenge shaped plate is completed by the oblique webs 5 which are unperforated. In addition to the extreme holes 4 at the corners of the plate, additional inner holes 4a may be made at the longer ends of the plate, and the holes 4 at the ends of the transverse web 2 may be continued to form a series 4b throughout this transverse web, such holes 4b and the end holes 4 being preferably spaced equally apart to conform to the standard pitch of the perforations adopted in the other elements of the toy building system with which the plate is to be used. This same standard pitch preferably obtains as between the holes 4 and 4a on the longitudinal web 1, and it is desirable also that the distance apart of the holes 4a with reference to the central hole 4b should be some multiple of the standard pitch of the perforations in the toy building system. In order to strengthen the webs 1, 2 and 5 of the plate they may be flanged up as shown at 6, Fig. 2, thus producing a shallow channel section. Or, as illustrated in the modification Fig. 3, and the section Fig. 7, this strengthened construction may take the form of stamping up a longitudinal ridge 7 in the webs. In the construction shown in Fig. 3, the plate is practically halved along the major axis, and in the form shown in Fig. 4, the lozenge plate is practically divided along the minor axis, while in Fig. 6, the form shown is the corner triangular portion of the lozenge. From

any of these elements Figs. 3, 4 or 6 the complete form of lozenge plate may be built up by bolting together. In Fig. 5, is shown a lighter form of the lozenge plate where the major axis web is eliminated.

Such types of plates lend themselves to a variety of constructions.

Any of these elements as described may be coupled together through the holes in their lugs with bolts and nuts to build up a strong type of braced structure such as the sides of model bridges, towers, platforms, observation posts, and standards generally, the triangular form of the elements serving to provide a flat finish along the side of the structure and acting as filling-in pieces. For instance in Fig. 8, a series of half plates as shown in Fig. 3, are bolted together at their perforations 4 to form a braced girder suitable for toy bridge construction, the ends of the girders being supported upon any suitable abutments 8.

With any of the forms described tie pieces may be used consisting of plain strips having perforations at each end, by means of which the strips may be bolted to the plate elements and form tie members, and the ends of these strips in which are formed the perforations may be bent up at right angles, or well known forms of continuous perforated strips may be used.

An example of this is given in Fig. 9, where the two plate elements are bolted together to form a roof truss, the end holes being connected by a bolt and nut at 4, and the other end holes 4 of their transverse webs being coupled by a perforated strip 9 which forms the tie member of the roof truss. By assembling a series of such trusses together a serviceable roof suitable for toy construction may be quite quickly put together, the feet of the trusses resting again on some abutments 8.

In order to secure the feet of any of the elements to a bed plate or otherwise, a bracket piece may be provided consisting of a sole plate having an upstanding lug or lugs the sole plate and the lugs of this bracket piece being perforated so that they may be bolted down on a bed plate and to the perforated lugs of the elements respectively.

Such an element forms an extremely light, yet rigid part and is very useful for building up various types of models.

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 symmetrical lozenge shaped stamped sheet-metal plate element having apertures formed therein so as to leave material only along the major and minor axes and inclined side webs forming a periphery to the element, the ends of the axial webs being provided with holes to enable a series of elements to be assembled together, with or without a series of such holes, at some standard pitch, on the major or minor axes.

2. A triangular stamped sheet-metal element having an aperture or apertures formed therein so as to leave material only along the base, perpendicular and oblique side or sides of the triangle, the ends of the triangle being provided with lugs having perforations therein by means of which the elements may be assembled together.

3. The improved elements for use in building constructional toys or models substantially as described and as shown in Figs. 1 to 9 inclusive of the accompanying drawings.

Dated this 3rd day of December, 1917.

For the Applicant,

A. J. DAVIES,
Patent Agent,
37, Moorfields, Liverpool.

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

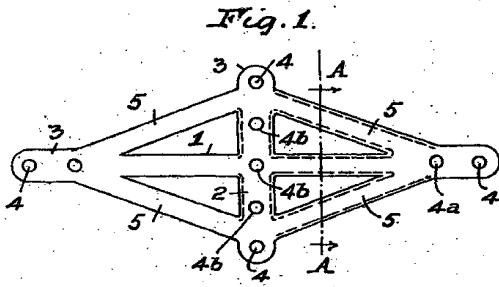


Fig. 2.

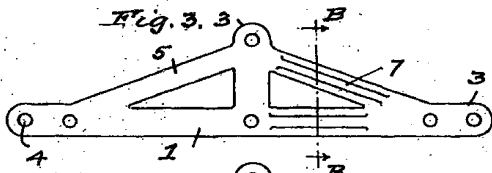
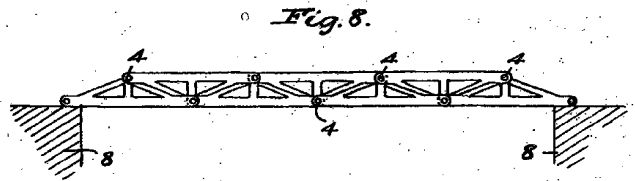


Fig. 7.

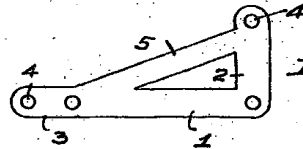
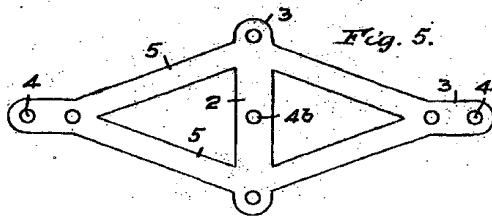
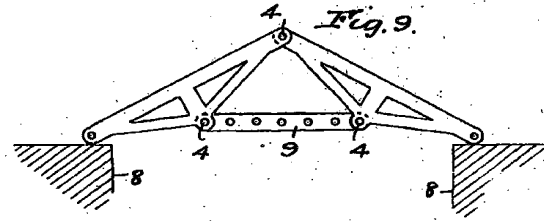
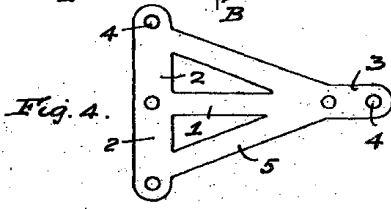


Fig. 1.

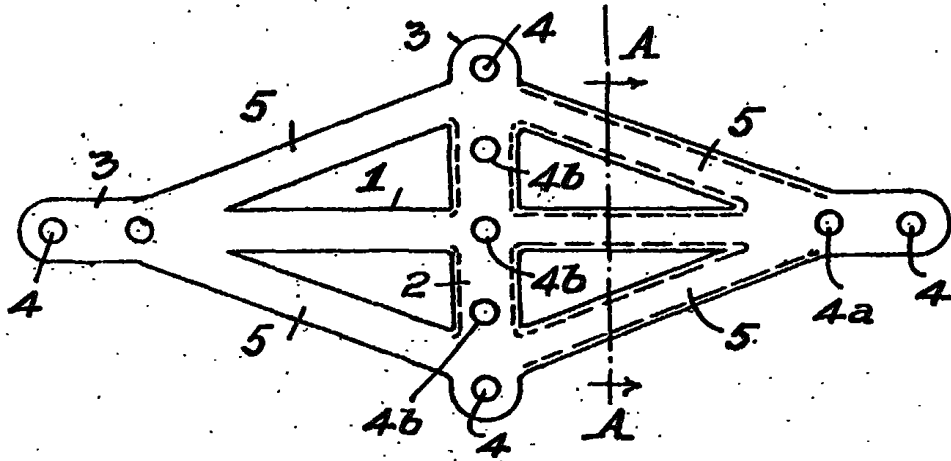


Fig. 2.

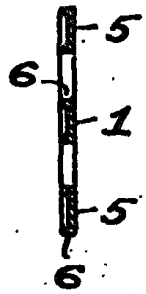


Fig. 3.

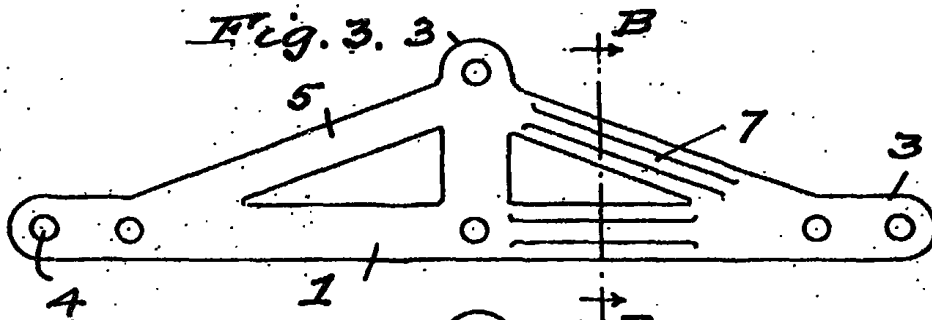


Fig. 7.



Fig. 4.

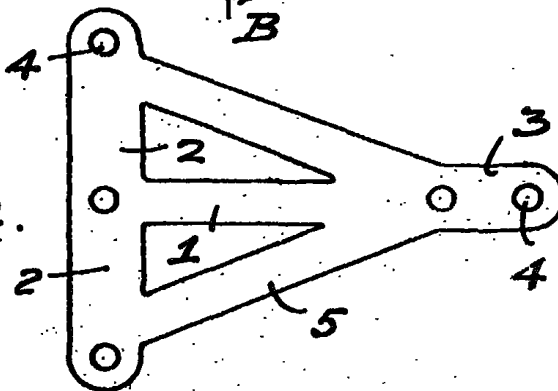
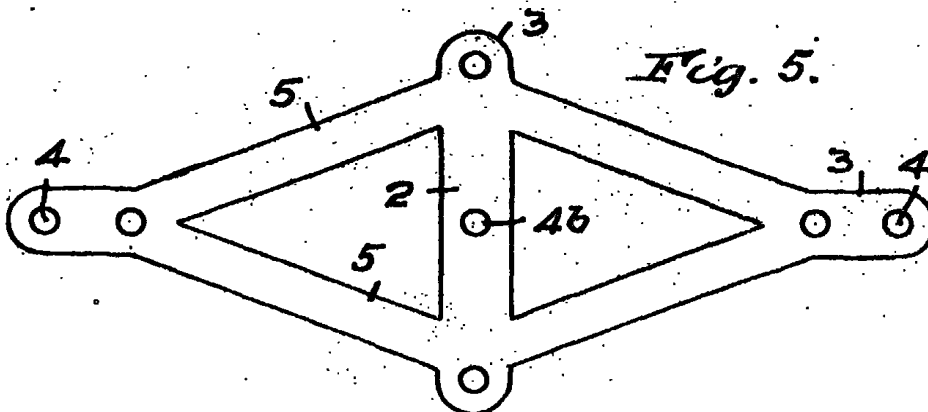


Fig. 5.



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

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Fig. 8.

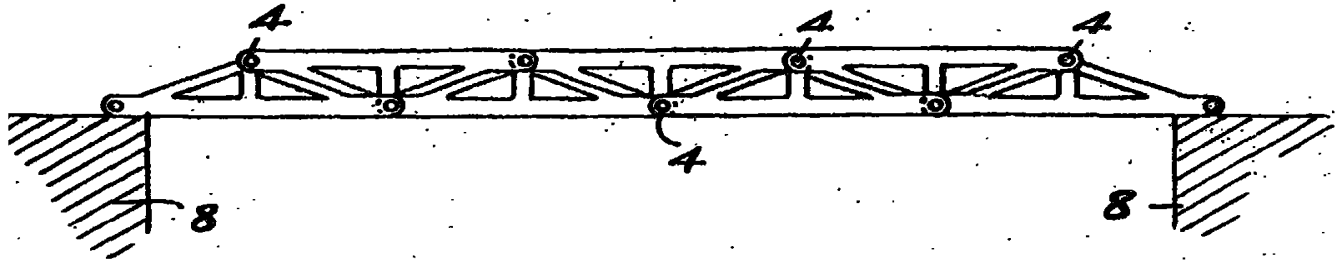


Fig. 9.

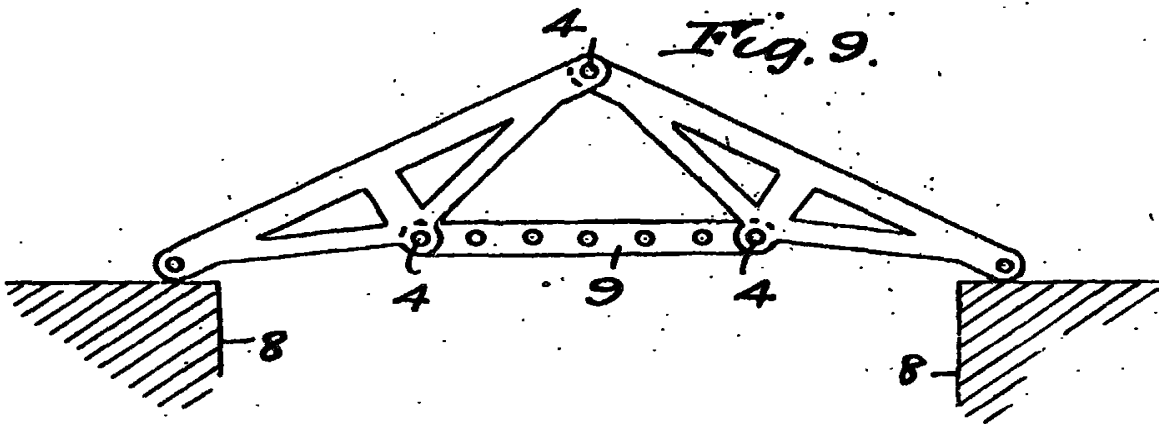


Fig. 6.

