

## PATENT SPECIFICATION



Convention Date (France): Feb. 3, 1933.

434,802

Application Date (in United Kingdom): Feb. 5, 1934. No. 3645/34.

Complete Specification Accepted: Sept. 5, 1935.

## COMPLETE SPECIFICATION

## Improvements in or relating to Constructional Toys

We, LOUIS ROUSSY, of 4, rue Yvon Villarceau, Paris, France, a citizen of the Swiss Federation, and RENÉ TRUBERT, of 6, Avenue du Général Gouraud, Viroflay (Seine-et-Oise), France, formerly of 284, rue de l'Arsenal, Arras, Pas de Calais, France, a citizen of the French Republic, 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:—

The present invention relates to that type of metal constructional toys comprising a relatively small number of simple metal elements such as strips, angle bars, L-pieces, plates, discs and the like, these elements being hitherto pierced with holes to permit of assembly by means of screws and nuts.

More particularly the invention relates to the method of assembling the said elements with the object of replacing the screws and nuts by simple clip fastenings. The latter are provided with embossings or holes to which correspond similar devices formed on the pieces to be assembled. The pieces to be assembled have embossings which form projections in relief on one side of the metal strip and corresponding depressions on the other side. At the time of assembly these engage the one in the other.

The object of the invention is an arrangement of assembly of these various pieces which allows of carrying it out in a simple and cheap way. It consists in providing these pieces with small embossings forming simultaneously projections and depressions and arranging them in sets in such a way that they allow of placing together the pieces to be assembled in all positions at present employed in these assemblies, and in conditions such that two respective sets of embossings and depressions are engaged, which stops their angular displacement. The pieces thus placed together in position are fixed by means of resilient fasteners of U cross-section, the fasteners themselves being provided with embossings similar to those arranged on the pieces to be assembled.

It has already been proposed in constructional toys of this kind to replace the small bolts and nuts by flexible metal fasteners formed of sheet material bent on themselves, comprising embossings capable of being engaged in corresponding depressions formed in the pieces to be assembled; or to provide the pieces with devices similar to press-buttons.

The fastening used in this invention comprises principally a simple metal band bent in such a way as to constitute a spring clip of U cross-section, which may be made in various forms. This piece is formed with small depressed or raised embossings, i.e. dents which form a corresponding projection on the other side of the metal. Alternatively, holes may be formed in the clips, or holes and embossing may alternate. The elements to be assembled carry the same arrangements reversed, so that to assemble them it is sufficient to force a fastening astride them.

The features of the invention will better appear from the following description taken in conjunction with the accompanying drawings which represent by way of example various forms of the fastening clips and the corresponding formation of the parts to be assembled, in accordance with the invention, and which are intended for the inter-assembly of various detached pieces.

On the drawings, Figure 1 shows in elevation two extremities of the elements to be assembled by the aid of one possible form of the fastening according to the invention, whilst Figure 2 is a section on II—II of Figure 1, and Figure 3 is a section on III—III of Figure 1.

Figure 4 shows in plan view a fastening with embossings and holes for assemblies in the form of a T, and Figure 5 a fastening in the form of a right angle.

Figure 6 shows a form of clip of smaller dimensions provided with embossings and adapted, for example, for the assemblies of cross pieces as shown in Figure 7, or angle bars as shown in Figure 8.

Figure 9 shows a section on the line IX—IX of the assembly in Figure 8.

Figure 10 shows two elements to be

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assembled and a fastening of a special form.

Figure 11 shows a cross-form assembly by means of the fastening of the preceding figure.

Figure 12 shows a method of assembly by means of fastenings of narrow form, and Figure 13 shows a more complicated erection by means of these fastenings.

Figure 14 shows a form of fastening for angle assemblies.

Figure 15 shows in section to a much larger scale the adjacent parts of two elements to explain the interengagement of the said embossings and the possibility of bolting in addition.

In essence, the invention consists in providing the pieces to be assembled with the aforesaid inter-engaging embossings and depressions, and providing a spring clip to be placed across the junctions so as to hold the pieces in fixed angular relationship; alternatively, where fixed angular relationship is not required or is otherwise secured, in providing the embossings on the clip and holes on the pieces to be assembled. On the Figures the embossings have been indicated by the reference 2 and the corresponding depressions, i.e. the dents on the other side of the metal by which the embossings are produced, by the reference 2<sup>1</sup>.

The fastening 1 for adjacent sheet metal elements 5 comprises in all cases a clip of springy material of U cross section, and the form of the clip may be elongated for joining abutting ends of strip elements as shown in Figures 1 and 2, of T or L form as shown respectively in Figures 4 and 5 or of narrow form as hereinafter described. At each end of the clip 1 and on each side or limb of the U, the metal is forced inwards to form the embossings 2 on the inside of the clip which are adapted to engage with the holes 4 in the elements to be assembled. In the example shown, these holes are arranged in groups of five very close together. Between and beside the embossings 2 in the clip 1 holes 3 are pierced for the reception of bolts which in certain cases could reinforce the connection between the elements to be assembled. To assemble, the elements 4 are simply pushed between the yielding sides of the clip 1, after which the embossings 2 spring into the holes 4.

It is to be understood that the holes and embossings can be arranged inversely, that is to say, the former in the fastening clip and the latter on the elements to be assembled. Likewise, the fastening 1, Figure 1, may be cut away at the bend at either or both ends, as shown at 1a in

Figures 10 and 11, thus offering possibilities of more varied assemblies.

More or less narrow fastenings of the type shown in Figure 6 may be employed in the angle between cross pieces (Figure 7) or in similar locations in more complicated erections (Figure 13), but this narrow form may be used in any location where simple clipping is required, as in Figures 12 and 13. The fastening with embossings shown in Figure 6 may also be used to fix strips to angle bars. To this end, as shown in Figure 9, the angle bars are provided with slits 12 located across their arrisses into which slit can be introduced one of the branches of the clip, holding the element to be assembled on the inside of the angle as shown.

Figure 10 shows another method of forming the clip according to the invention. In this case the pieces to be assembled are provided with embossings and depressions preferably disposed as shown in Figures 10 to 13, and 15. Fastenings of the very simple form shown on Figures 10 to 13 allow for effecting the most varied and extremely rigid erections. The cross section of these fastenings is of U-form, but endways they may be made of any form suitable for the work, as in Fig. 14, which shows a fastener bent to an angle longitudinally, one limb being cut through to facilitate this formation. This Fig. also shows perforations in the fastener.

It will clearly be seen in Figure 15 how the embossings 2 engaging in the depressions 2<sup>1</sup> secure the two pieces 5 when a fastening is forced astride the latter. It is to be noted that the depressions 2<sup>1</sup> must have a diameter slightly greater than that of the embossings 2, especially when the pieces are painted, so as to facilitate the lodgment of the embossings 2 in the depressions 2<sup>1</sup>. This Figure also shows coincident apertures 5<sup>1</sup> in the parts for the purpose of bolting them together.

The assemblies by fastenings which have just been described could be completed in certain cases by bolts. In the latter case, the rigidity of such an assembly would be proof against any forces tending to displace the members angularly.

It is to be understood that only those methods of assembly have been described which are the most characteristic for showing the various possible uses which can be derived from the new constructional toy; it is therefore intended that the invention shall not be limited to the methods of carrying out which have been described and that it could be carried out by other means coming within the scope of

the following claims without in any way departing from its scope.

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:—

1. A constructional toy comprising a plurality of sheet metal elements to be assembled pierced with sets of holes and spring clips of **U** cross-section having embossings on the faces of their branches adapted to spring into said holes when the clips are forced on to said elements.

2. A constructional toy comprising a plurality of sheet metal elements to be assembled provided with sets of embossings and spring clips of **U** cross-section having holes in their branches adapted to spring onto said embossings when the clips are forced on to said elements.

3. A constructional toy comprising a

plurality of sheet metal elements to be assembled with flat surfaces in engagement having in said surfaces on one side of the sheets distributed sets of depressions formed by denting the metal and on the surfaces on the other side of the sheets embossings formed by the said denting and engageable with the said depressions and spring clips of **U** cross-section to be forced astride the junctions of said elements.

4. A metal constructional toy as claimed in any of the preceding claims in which said elements are pierced with bolt holes which become coincident when said embossings and depressions or perforations are in engagement.

Dated this 20th day of January, 1934.

p.p. the Applicants,

C. H. CLARKE,

Chartered Patent Agent,

24, Hermon Hill, London, E.11.

Fig. 1

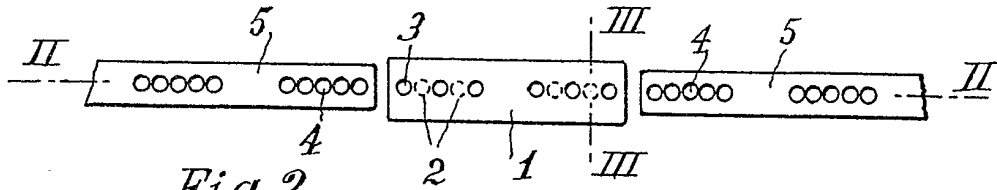


Fig. 2

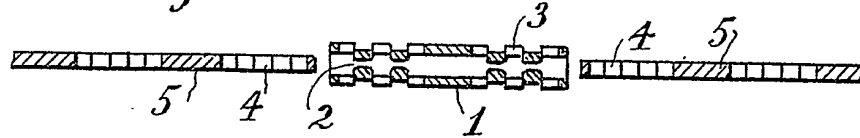


Fig. 3

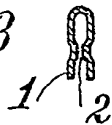


Fig. 4

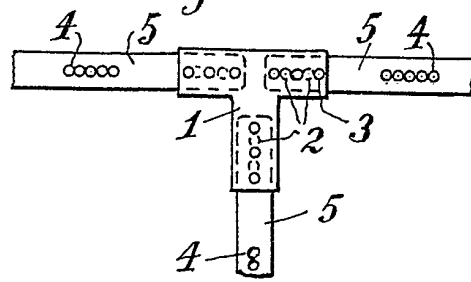


Fig. 5

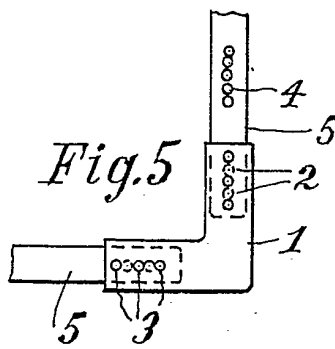


Fig. 7

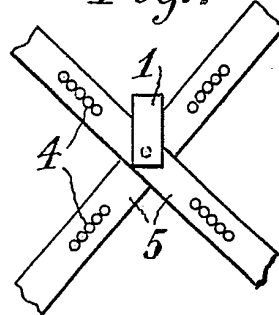


Fig. 6



Fig. 8

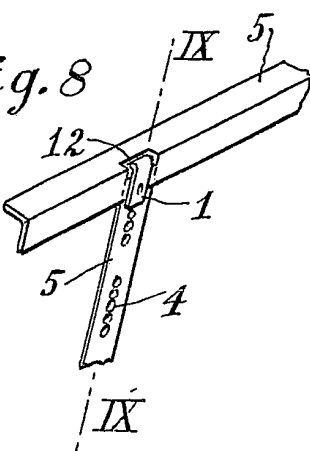
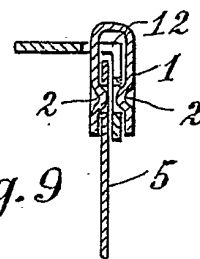


Fig. 9



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1a\

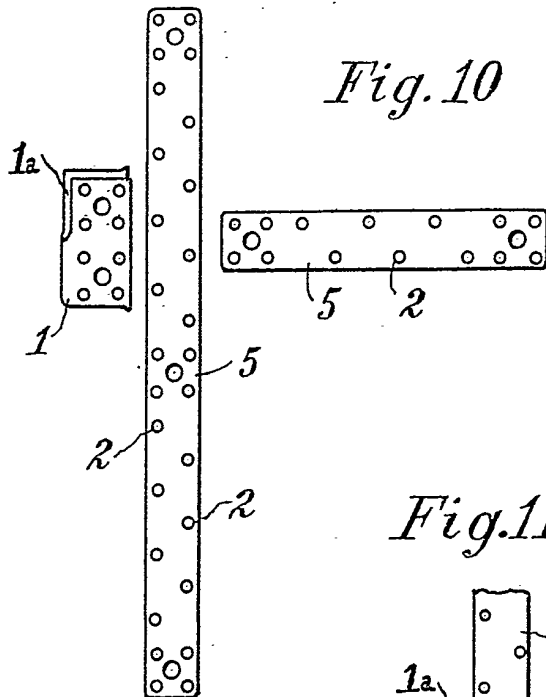
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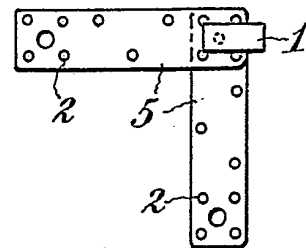


II

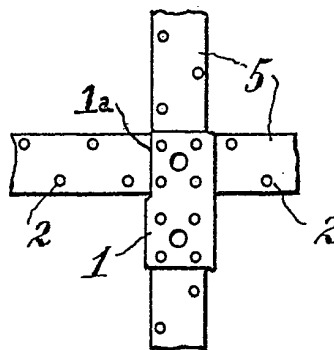
*Fig. 10*



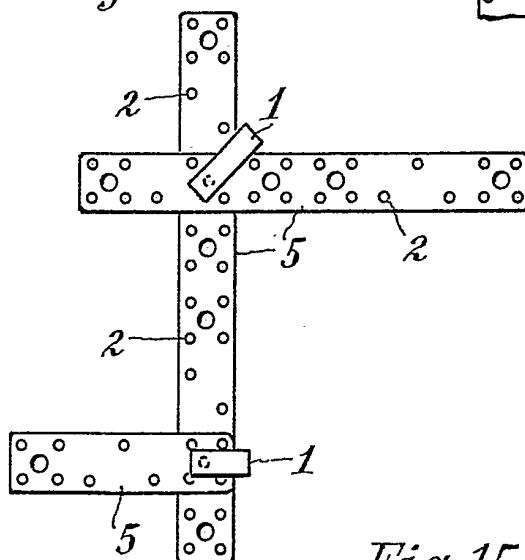
*Fig. 12*



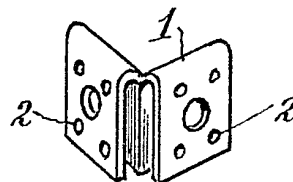
*Fig. 11*



*Fig. 13*



*Fig. 14*



*Fig. 15*

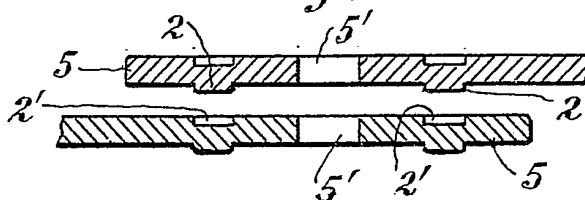


Fig. 1

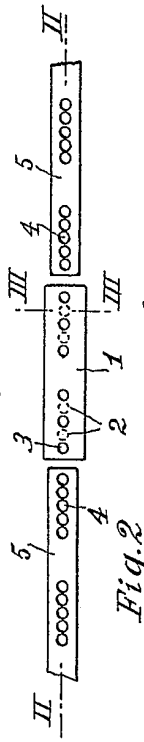


Fig. 2

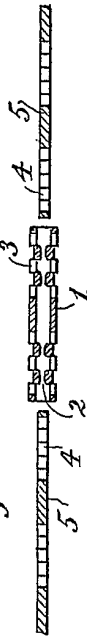


Fig. 3



Fig. 4

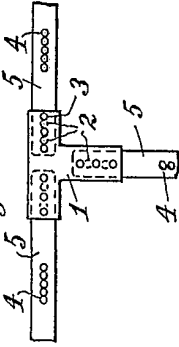


Fig. 5

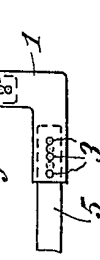


Fig. 6

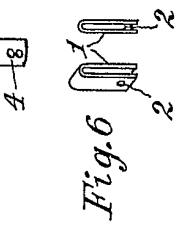


Fig. 7

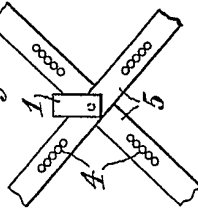


Fig. 8

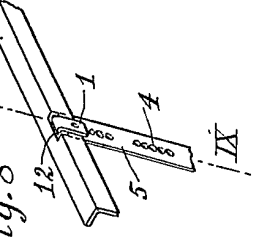


Fig. 9



Fig. 10

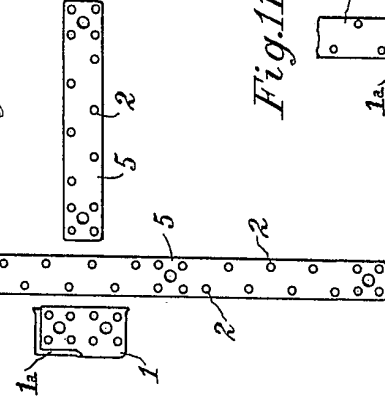


Fig. 11

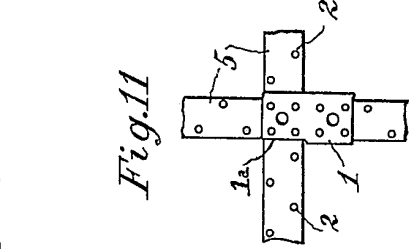


Fig. 12

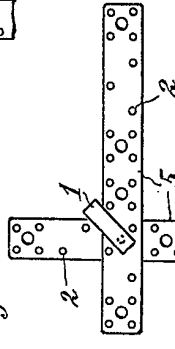


Fig. 13

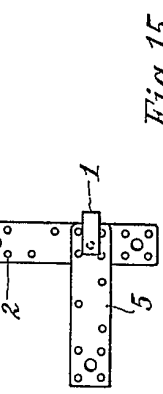


Fig. 14

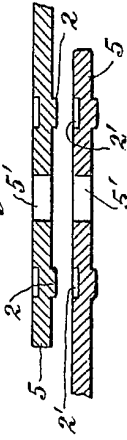
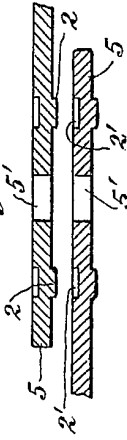


Fig. 15



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