KELLER

A METAL CONSTRUCTIONAL TOY FROM THE EARLY 1890's

(By David Hobson – revised 1999)

History

Although the patent literature of the second half of the 19th century contains quite a number of examples of inventions for building and constructional toys, nothing more seems to have been heard about most of them. However, a few of these new toys did become well known commercial successes, for instance, Richter's reconstituted stone blocks, and Crandall's wooden blocks with combed joints. I was therefore surprised when a set of small rusty parts turned up at a Toy Fair, which I vaguely recognised as corresponding to one of these "forgotten" 19th century patents. Sure enough, on checking when I got my find home, the parts did indeed correspond to those described in British Patent 5781 of 1890. This has an application date of 16th April 1890, the Complete Specification being left on 15 January 1891, and it was accepted on 16 April 1891. The title is "Improvements in Apparatus for Building Toy or Model Buildings, Bridges, Towers and the like", and it was granted to Georg and Paul Keller, of the town of Rudolstadt in the Empire of Germany, and who are described as Manufacturers. Most likely there is a corresponding German Patent, but I have not been able to find this so far. The dense Gothic print of the German 'Patentblatt' does not encourage my eyes to search for very long! There does not seem to be a corresponding United States Patent.

Rudolstadt is of course the home of Richter's famous Anchor Blocks which were first produced in 1882. When I first acquired the set, it was interesting to speculate if there was some connection between the Kellers and Richter, particularly because the Patent begins - "This invention relates to an extension of the means for instructive occupation known as 'The building with real stone blocks'...". On the other hand, the actual example of the Kellers' outfit which has turned up does not have any markings which could connect it with the Richter organisation. Furthermore, the special Anchor Block outfits with metal parts for bridge building which Richter marketed quite extensively, were based on different principles to the Kellers' invention. 1 subsequently found out that the first of the Richter sets with metal parts was known as the Bridge Box, and was marketed in 1895. It was based on the use of adjustable slotted metal strips, as described in German Patent 67599 of 1892 to Julius Weiss of Hamburg. Richter seems to have had a licensing agreement to use Weiss' invention. This was a very large and expensive set, and very few seem to have been sold. None of the original metal parts have turned up so far, but the members of the Club van Ankervrienden (Club of Anchor Friends) in Holland have located drawings, and reproduction parts have been made. Later, from 1901 through to the 1920's, Richter used simplified metal parts, including pressed lattice girder frames, and these seem to have been covered by German Patent 133728 of 1901 etc.

The nature of the supposed link with the Richter organisation became clear when I read Gerge F. Hardy's book 'Richter's Anchor Stone Building Sets'. The Keller brothers had indeed

worked in Richter's stone block factory in Rudolstadt, but in 1886 they left to set up their own business in the same line. They competed with Richter in a small way for about 25 years, and eventually Richter bought them out in 1910 when they were ready to retire. The Keller stone blocks seem to have been of the Kleines Kaliber or KK type (small caliber) based on a 20mm cube, rather than the more common 25mm GK type, and they may also have been embossed. However, George Hardy and the CVA were not aware of the metal parts produced by the Kellers, and it appears that the brothers invented this feature so as to have a competitive advantage over Richter's sets at that time. This supposition was subsequently confirmed when I located a note in the London toy trade journal 'Games, Toys, and Amusements' of April 1895. A small paragraph on page 17 is headed Messrs. B. A. Grautoff and Co., 5 Jeffrey's Square, St. Mary Axe, London, and states "This firm are agents for Messrs. Keller Brothers, of Rudolstadt, Germany, who own the patents for the Iron and Stone Constructions, one of the best educational toys in the market. The boxes contain very light steel and tinplate iron constructive parts and coloured real stone blocks. The prices to retail, are No. 1 36s., No.2 60., No.3 72s." Presumably, these prices are per dozen. The same page also carried a note on Richter's Anchor Boxes, and Richter had a London Office at 44 Jewin Street at this time.

The Outfit

The metal parts were in three cardboard boxes of the simple pull-out drawer type measuring 200x50x20 mm, and one box 160x35x18 mm. The boxes are covered in black leather-effect paper, with the following in embossed silver printing on the top side:

LONDON 1891
Hochste Auszeichnung
FIRST PRIZE

There is no mention of the manufacturer or supplier on the boxes, and therefore it is not certain if these are the original containers. However, they are just large enough for the longest parts, and it seems likely that the reference to London 1891 and the First Prize could refer to an Anglo-German trade exhibition which was held at the Earl's Court Exhibition Centre in that year. So far, attempts to locate a catalogue for this exhibition have not been successful. If the outfits were indeed first marketed around 1891 as indicated by the box, this would certainly be in agreement with the 1890 date of the Kellers' patent and the note in 'Games, Toys, and Amusements'.

There was no sign of any stone blocks which would have presumably originally accompanied the metal parts, but most likely these would have been in a separate wooden box - which became separated from the metal parts at some time.

The Parts

After more than 100 years, not surprisingly, the parts showed signs of surface rust. This was carefully removed and a wax polish applied to prevent further deterioration. The following list is based on the identification letters used in the Kellers' Patent Specification drawing, and dimensions are in mm with the quantity of each part given in brackets.

Part G, Fig. 7, plain flat strips, grey coloured slightly springy steel, 4 wide x 0.25 thick. In the following lengths :- 65(3), 55(16), 50(15), 40(12), 35(25), 30(20), 25(52), 20(18)

Part A, Fig. 1 etc, folded double-thickness T-girders, mild steel, possibly thin nickel plating, double thickness of web 0.7, height 5.5, width over flanges 5.5. The webs are pressed tight, but the bends on the flanges left slightly rounded. In the following lengths:
Straight - 200(8), 100(12), 50(6)
Curved, web of T convex side, 200(4)
Curved, web of T concave side (web has four slits, presumably to prevent buckling), 200(4)

Part S, Fig. 11, folded double-thickness strip, mild steel, possibly thin nickel plating, 0.7 thick, 5 wide. Only pressed tight over half the width along the side with an open edge, to leave a slightly rounded bend at closed edge. In the following lengths: 200(4), 100(2)

Part K, Figs, la and 7a, claw-strip, grey coloured slightly springy steel, 0.4 thick, 5 wide, two slits 5 long at each end where a rounded 3-prong claw is formed. In the following lengths: 100(6), 40(6), 35(3)

Part F, Fig. 6, plain plates, untreated mild steel about 0.25 thick, length 40, width 20, quantity 10.

Part F(l), plates with claws, formed from plain plates but with four shallow rectangular claws about 2x4 pressed out on one side of the plate. The claws have been formed by piercing three sides of a rectangular hole, about 5 from each end and 3 from each side, and then pressing out a claw which faces the long side of the plate (20).

This part is not shown in the patent drawing, but it seems the intention may be that the plates can be joined to form larger plates by interlocking using the claws. The large plates could then be used, for example, as the decks of bridges.

These are the only types of parts found in the outfit, and it is not known if any of the other types of parts described in the Patent Specification were actually produced.

Part D, Fig. 5, the joining shoe with claws, would be difficult to use in practice, and in any case, the T-girders can easily be joined end-to-end by inserting flat strips lengthwise in the double-thickness webs. Similarly, the adjustable strip, Part G', Fig. 8, would be fiddly to use in practice. The need for this part seems to have been avoided by providing a good variety of lengths of plain strips in the outfit. There were no suspension bridge chains or rods, Fig. 9, and this is a pity because they could certainly be used to make attractive period bridges. However, such simple parts are readily available elsewhere. There were no double-thickness T-girders with open edges to both the web and the flanges, as shown in Fig. 13. This is a pity, because such a part would allow more elaborate structures to be built than is possible with the range of parts described above. The probable reason is that they would most likely be difficult and expensive to manufacture. There were no tubular parts as shown in Figs. 14 -19.

Models

There was no descriptive literature with the present outfit, and so a freelance model bridge was constructed using some of the principles described in the Patent Specification.

The main supporting structure and balustrades were based on lattice bracing using the principle illustrated in Fig. 7. The plain strips, part G, can be slid between the double thickness web of the T-girders, part A, quite easily at the open ends of the girders. However, when it is desired to insert the strips at intermediate points along the length of the girder, this is almost impossible unless a sharp pointed blade is used to carefully open the double-thickness web slightly, so that a comer of the strip can be inserted. This can then pushed home, and it is held quite firmly. It was found best to insert the strips at their approximate positions in the lower T-girder first, and then to successively insert them in the upper girder as this is worked into place. Some final adjustment is then usually necessary by sliding the ends of the strips into their exact locations. This is all a rather fiddly operation, and I think many children would be deterred. The use of a sharp blade to assist the insertion of the strips along the length of the girders could also present some hazard for both children and adults alike! Nevertheless, when constructed, the braced girders were surprisingly strong, but obviously they are not capable of withstanding the relatively heavy loads which can be applied to structures fixed with nuts and bolts, Meccano fashion.

The claw-strips, part K, Figs, la and 7a, were used as struts to link the sides of the bridge by connecting the flanges of the T-girders at appropriate points. This type of strip is necessary because the flanges of the T-girders have a closed edge, and plain strips cannot be used. The claws are relatively stiff, and it was found best to slide them along the slightly rounded flange of the T-girders from one end, rather than to force them into place at the desired location. Also, most of the claws had been left rather rough at the edges during manufacture, and this made it difficult to put them in place, whatever procedure was adopted. These difficulties, together with the relatively weak joints which the claw-strips make, means that they are less satisfactory than the plain strips inserted between the double-thickness web. However, in order to join the T- girders flange-to-flange using this method, a girder which had both an open double thickness web, and flanges, would be required. As mentioned above, although such a part is indicated in the Patent Specification, Fig. 13, it would presumably be quite difficult and expensive to manufacture.

The plates with claws, part F(l), are not mentioned in the patent specification, but one of their applications seems to be that they can be interconnected using the claws, to make much larger plates. This was tried in order to make a deck for the bridge, and the procedure worked reasonably well. Alternatively, a deck could be made by inserting plain plates, part F, between pairs of double thickness strip, part S. The resulting deck or roadway was then simply placed on the cross-beams formed by the claw-strips, since there is no obvious way of fixing it to the structure. Balustrades were constructed in the form of braced girders, Fig. 7, and again, these were simply placed along each side on the deck.

To summarise, the Kellers' system is based on a form of T-girder which has a double thickness web with an open edge. However, once the two joining procedures illustrated in Figs. 7 and 7a have been exhausted, there is no way of further extending a structure. The provision of the type of T-girder illustrated in Fig. 13 (which has both open edge double-thickness web and flanges) would help to improve this aspect, but as mentioned above, such a part was probably too difficult and costly to manufacture. The scope of the Kellers' system as represented by the present outfit is therefore rather limited. Nevertheless, the absence of perforations in the strips and girders does mean that the models do have an undoubted charm and elegance, which is lacking say in a corresponding Meccano model.