

THE IRON CONSTRUCTOR

by Jacques Pitrat

Some information on this early American system, described in OSN29/854-855, appeared in the manual of its successor, THE PRACTICAL IRON CONSTRUCTOR AND DEMONSTRATOR. Only a 1895 British patent was indicated in OSN, but there was also a U.S. Letters-Patent No.525,221, August 28th, 1894, & a German Gebrauchs-Muster No.30,647, September 11th, 1894.

THE IRON CONSTRUCTOR sets were introduced in October, 1894. Thus it is the second system with metal parts, after the Keller Brothers bridge sets, but before the 1895 Richter bridge set. It was probably the first system with Nuts & Bolts, and the first all-metal construction system since Keller's was a stone system completed with metal parts. [See 26/778 for brief notes on the KELLER system, & 25/730 for RICHTER.]

It seems that there were some defects in the manual and the parts of THE IRON CONSTRUCTOR - it is said in the manual of its successor, written in February 1895: "This toy, the Practical Iron Constructor, is like a young baby; it has only

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THE IRON CONSTRUCTOR: S3

THE PRACTICAL IRON CONSTRUCTOR AND DEMONSTRATOR

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This system replaced THE IRON CONSTRUCTOR and was produced by F. Wm. Rumpf, Architect & Engineer, of Paterson, New Jersey. The name of von Leistner, inventor of the preceding system, does not appear in the manual although the picture on the lid is signed "Rumpf & von Leistner DCL. 1894".

THE SETS The six sets in this system are, with the number of pieces in each in brackets: A (50), B (100), C (200), D (300), E (400), & F (950). The first three sets are in cardboard boxes, the others are in a wooden boxes, with the same box used for sets D & E. In the number of pieces, a Bolt, a Nut, and a Washer count as one.

The wooden box for **Set D** is 358*178*11mm and it has



the sliding lid above. The box, below, has two main compartments with the wooden parts in one and a wooden tray in the other. The latter has a compartment for each of the 7 main metal parts, one for the Nuts & Bolts, and a small one for the Washers. A small label with a letter on it is glued on one side of each compartment to indicate which piece it is meant for. The manual sits under the tray.

An interesting letter from the maker is still in the box. It is written with a pencil on a plain sheet of paper without heading, folded in four. It was addressed to a Mrs Neale,



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THE PRACTICAL IRON CONSTRUCTOR AND DEMONSTRATOR: S1

been introduced into the market since October 1894, but in this short time it has already grown up to full childhood, and it comes now forward in improved and more correct form, all mistakes made formerly - and who will not make mistakes - have been remedied wherever they have been discovered, the plates and drawings have been entirely worked over and enlarged, and all structures shown on plates have been actually tried and found correct."

However, it was also said that it was a success: "This toy has not only been bought by parents for their children to play with, it has also been bought by Architects, Engineers, and men in business and practice.....One firm alone, in New-York, has sold more than \$1,000.00 worth of this toy alone in two months...."

I am not sure that the system was so successful since THE PRACTICAL IRON CONSTRUCTOR AND DEMONSTRATOR, a completely redesigned system, was introduced at the beginning of 1895.

without her address; thus, it was delivered by a courier, and probably she was living in the same town as the maker. On the other side, there are the contents of set D and the following text: "We regret very much to inform you that our carpenter had not the time to make you a box for the box D. We send you two boxes instead hoping this proves satisfactory." This is a cottage industry and when there is an order for a large set, one asks the carpenter to make the box! Mrs Neale did not find this solution satisfactory since the set is in its proper wooden box, the carpenter had to find the time. Anyway that explains why two copies of the manual were in the box.

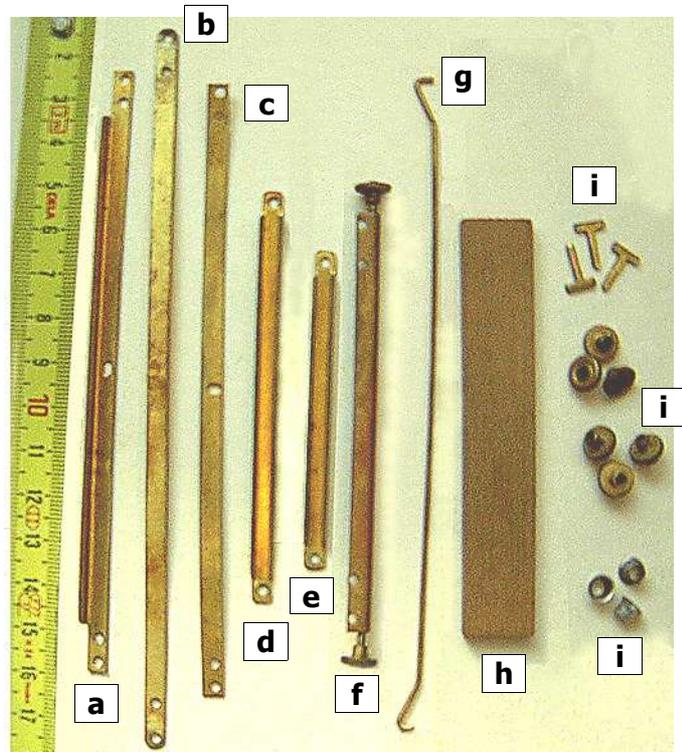
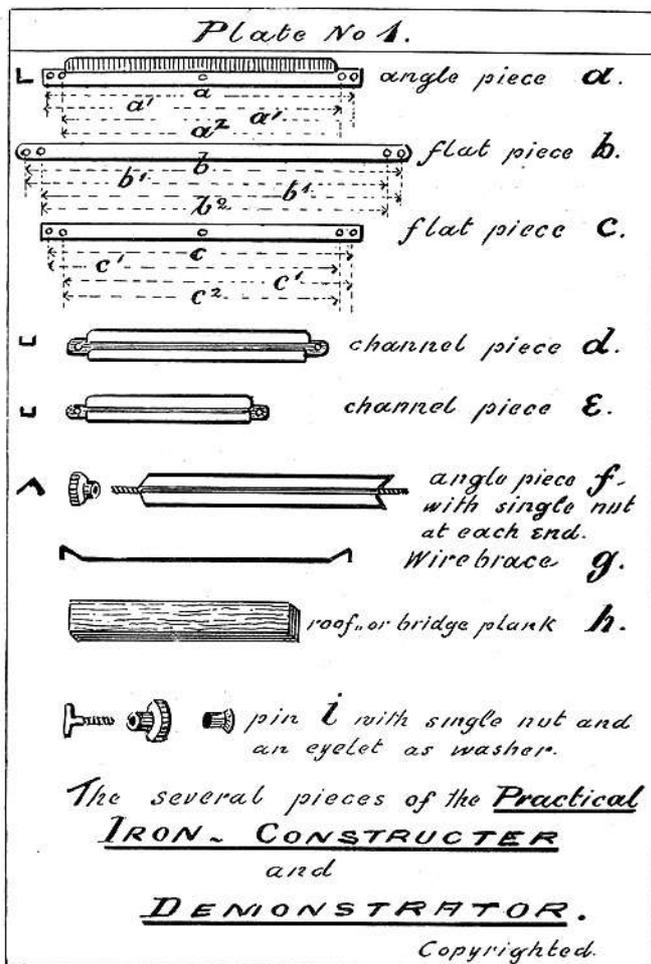
THE PARTS Although the parts of the new system look similar to those of the earlier one, they are all different, the only common characteristic is that the thread is the same. The difference is not only in the size and form of the parts, it is in the underlying design principle. The parts of THE IRON CONSTRUCTOR were often asymmetric: when there were two holes at each end their spacing was not the same; and when there was an intermediate hole, it was not at the middle. These characteristics gave the user a wider scope, but it was more difficult to use the parts. All the parts of the new system are symmetric.

The 11 different parts in the system are shown on the next page, from the manual, and in a photo of the actual parts. The diameter of the holes is 1.8 mm; all the parts are brass except the wooden Plank. In the notes on the parts that follow I often use the terminology of the manual, and quotes from it. In brackets are the number of each part found in set D followed by the price in cents for a dozen of the parts.

Angle Piece #a (50-24c). It is 5*5mm in section and has two holes at each end. That makes three possible distances between them; in the models they are indicated as a, a¹, and a² (a=133mm, a¹= 127.5mm, a²=122 mm). This part is used in compression. The centre hole is used in cases where two or more pieces are joined together to give the structure more strength. "You can form with the a's a channel, a double **T**, or **Z** bar by screwing them together with "i". You can form a hollow square tube by using three pieces a, and screw them together with "i"."

Flat Piece #b (30-18c). It is 5mm wide and also has two holes at each end. These give three possible distances: b, b¹, and b² (b=158, b¹= 150, b²=142mm). This part is usually used as a brace.

Flat Piece #c (25-16c). It is the same width as #b and also has two holes at each end; thus three possible distances: c, c¹, & c². As with #a, there is a centre hole which is again used to join two or more pieces together. c=a, c¹=a¹, & c²=a², so #a & #c parts can be bolted together. It is often used as the base or top member of frames.



sides of the shank. Now they are different but the problem is not solved: there is still thread only on the sides. They are a 10*7mm flat 'T', 1.2mm thick, with the leg 2mm wide. The length of the 'thread' is 5mm, so the threaded area is just 6mm² on each side of the leg. The poor quality of the bolts is certainly a very serious drawback of this system: "Whenever a screw works a little hard, try another one and they will in course of time work very easy. The screws in themselves have been very much improved in their working and make." It seems that 'very much' was not enough. This is curious, 7 years later Hornby had no difficulty in finding a manufacturer who made good quality bolts, they were among the best of the parts in the MME sets.

"You can bend the ends of a, b and c. The metal is very pliable and the ends straighten out again very easily."

Channel Piece #d (30-20c). 5.5*3.5mm high in section and the single holes at the ends are at 87mm pitch. Another part used in compression.

Channel Piece #e (30-18c). Also 5.5*3.5mm in section and used in compression. The end holes are at 65mm pitch.

Angle Piece #f with a Single Nut at each end (30-50c). This piece is a rod with threaded ends soldered to a 5*5mm section angle girder (as #a), and it is used as a cross-tie. The diameter of the rod is 2.0mm, its length 106mm, while the girder is 92mm long. The thread is longer at one end (8mm) than at the other (5mm), and the side with the long thread is to be used when three or four pieces are to be nutted on. The quality of the thread at both ends is good. There are two holes in each arm of the girder at each end but these 8 holes are not shown in the manual illustration. The rod prevents using Nuts & Bolts in these holes, and the ends of Wire Brace #g sit in them. Usually #f parts are used between the sides of a Bridge, joining each end of #a parts, and the resulting rectangle is braced by one or two #g parts.

Wire Brace #g (30-10c). This is used for wind & transverse braces; the length is 146 mm and the diameter 1.2 mm. Both ends are bent as shown and as already mentioned they are inserted into (and are very loose in) the holes of #f.

Roof or Bridge Plank #h (60-5c). It is very different from the large wooden part of the first system, and measures 92*16*4mm.

Bolt (called screw or pin), **Nut & Washer #i** (30-20c). In the manual the Washers are also called eyelets; they were not in the preceding system, and are an improvement - as the manual says: "For using the i to a better advantage and let the screws work more tightly, I have introduced eyelets as a washer, and you will find these washers very useful where only two or three pieces have to be jointed together."

Bolts were a problem with the earlier system, they were very crudely made with a flat head and thread only on the

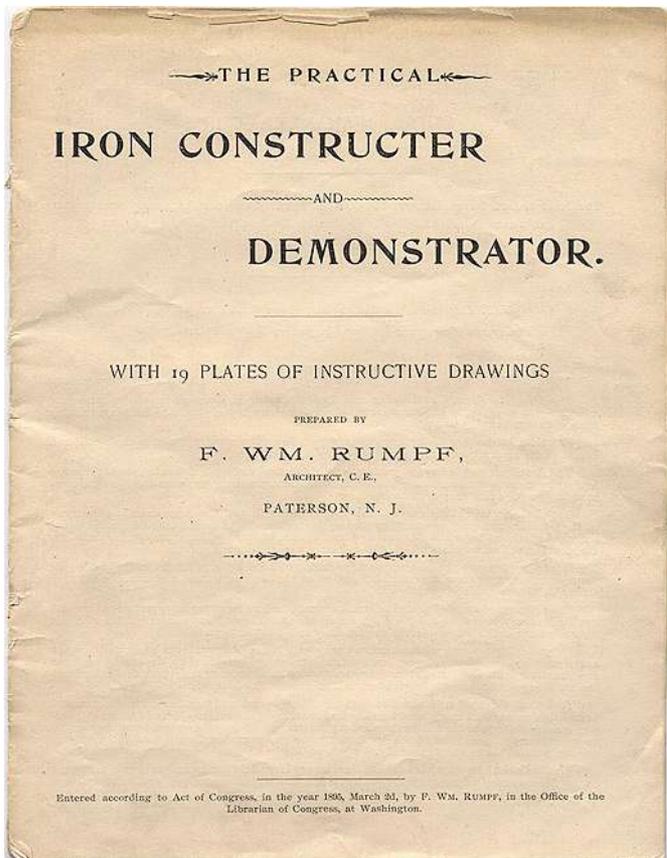
On the contrary, the quality of the **Nuts** is satisfactory, they are almost the same as in the previous system: the small differences enable the user to have a better grip. Among the #i Nuts some are Single and some Double (the Double have the 'boss' with tapped bore on both sides of the serrated centre disc). The quantity of each kind is not given, but of the 29 remaining Nuts in the box, from the 30 initially, there are 5 Single Nuts and 24 Double Nuts; there are also 30 Single Nuts with the 15 #f pieces. Double nuts are useful to assemble two #f parts for Bridges with two or more tracks.

As the Nuts have a serrated edge and the Bolts are flat, no **tools** are necessary.

The manual mentions that there are also 60 **Double Screws** in set F (15c a dozen). However, they are not in the description of the pieces and do not appear in the set F models.

The only parts not in the Set but necessary for some models are the **CORDS** and **WIRE CABLES** for suspension bridges (models 62 & 63 for set F): 'The cords you have in your home (any good double thread will do), and the wire cables you can easily get at nearly every hardware store; only see that it is flexible and not too thick to form a natural curve if hung up at both ends.'

THE MANUAL was written in February, 1895. It was entered, in accordance with the Act of Congress, in the Office of the Librarian of Congress, at Washington on March 2nd 1895. It has 24 pages, 203*153mm, including the covers which are printed on the same paper as the other pages. The front is shown overleaf (all the other manual pages here have been changed to B&W). Four pages present the system, and they are followed by 19 plates. The first of these describes the



parts of the system and the models are in the other plates. The set that can build a model is not given with the model, but the introduction indicates which models can be built by each set. With each model there is the number of parts necessary to build it. The 25 models of plates 2 to 5 are flat constructions made with triangles. The next models, on plates 6 to 19, include some Roof Trusses & Piers but are mainly Bridges. In all there are 63 models, but a Bridge and its piers are often counted as separate models. Curiously enough, the Eiffel Tower, then six years old, is not among the models although it would have been a good application of the system and it can be seen in the lid picture.

One of the plates for Sets A,B,C is shown right; the Girder Bridge on the facing page is from the D,E models and the Arch Bridge needs Set F. A 'language' is used to describe how the parts are put together. '2a²+c²' means that two #a & one #c, are overlaid and bolted together, and that they will be joined to the other elements by their inner holes.

THE EXHIBITION MODELS The box includes a 269*125mm photo: "Every box has also the pamphlet with the full set of drawings and a print taken from a photo of the exhibition at which all the several constructions and more of them, including a large suspension bridge with five roadways, similar to the Brooklyn Bridge, had been put up and exhibited." The photo, on the facing page, shows many models from the manual, and while some of them are quite small, among the larger ones is a model with two spans, each of them the No.62 for set F, so its length is over 2 metres. The most interesting model is the Brooklyn suspension bridge of which over half its length can be seen in the photo. The main span of the model would be around 4 metres and the overall length at least 5 metres. The height of the towers some 1.4 metres. It is impressive, the first supermodel, longer, wider, and higher than the MME Forth Bridge which was made 9 years later. Many years would pass before such a large model made from a metal construction system would be shown at an exhibition.

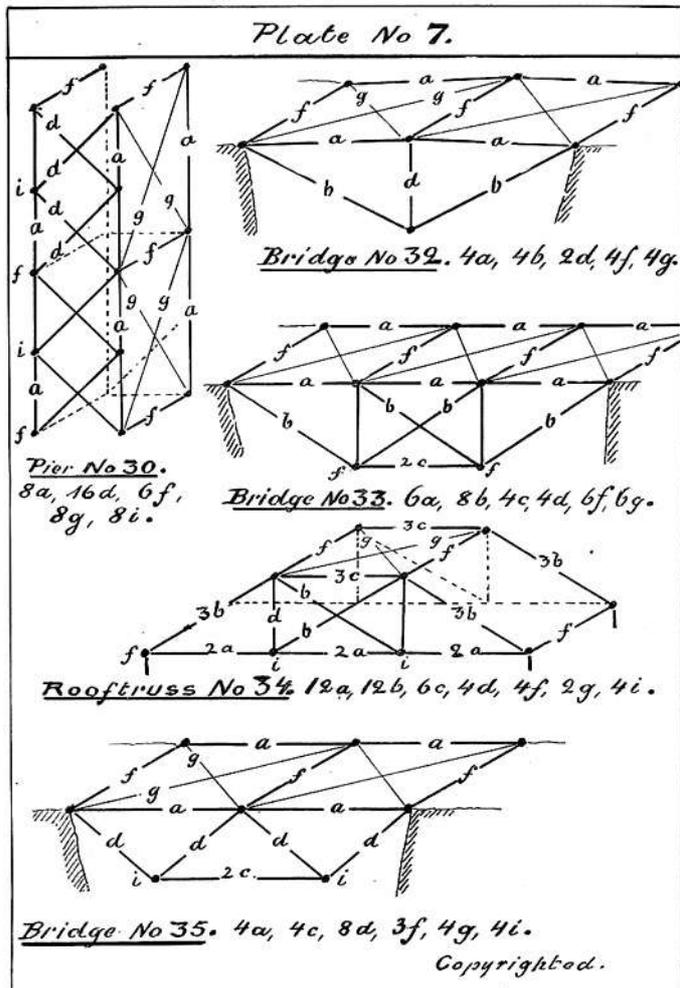
A KELLER CONNECTION? It is perhaps necessary to correct the last sentence since Baukästen says (p.46) that the brothers Keller presented a 5m model of the Brooklyn bridge at a Leipzig exhibition in 1897 and it earned them a silver medal.

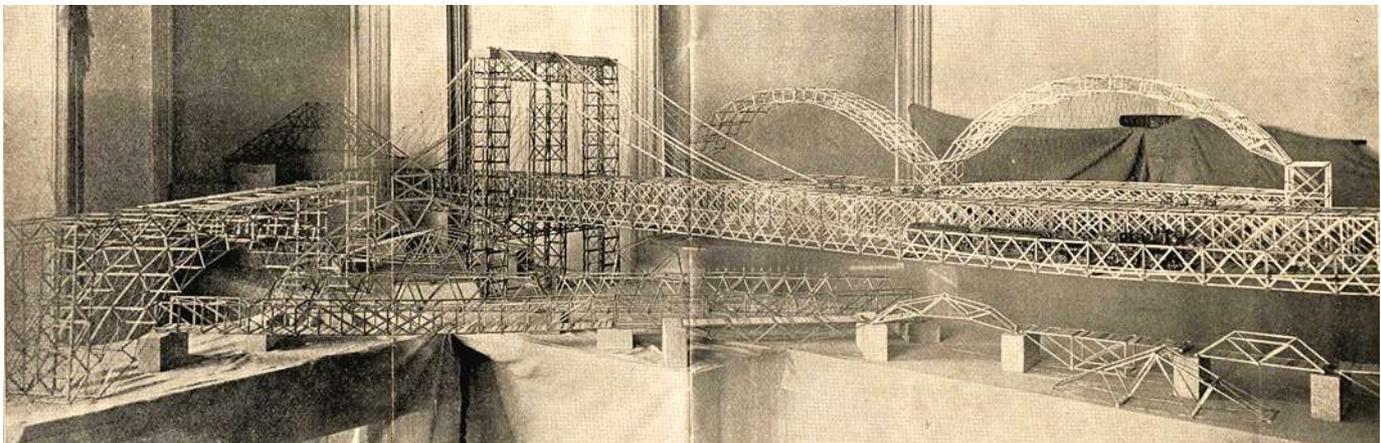
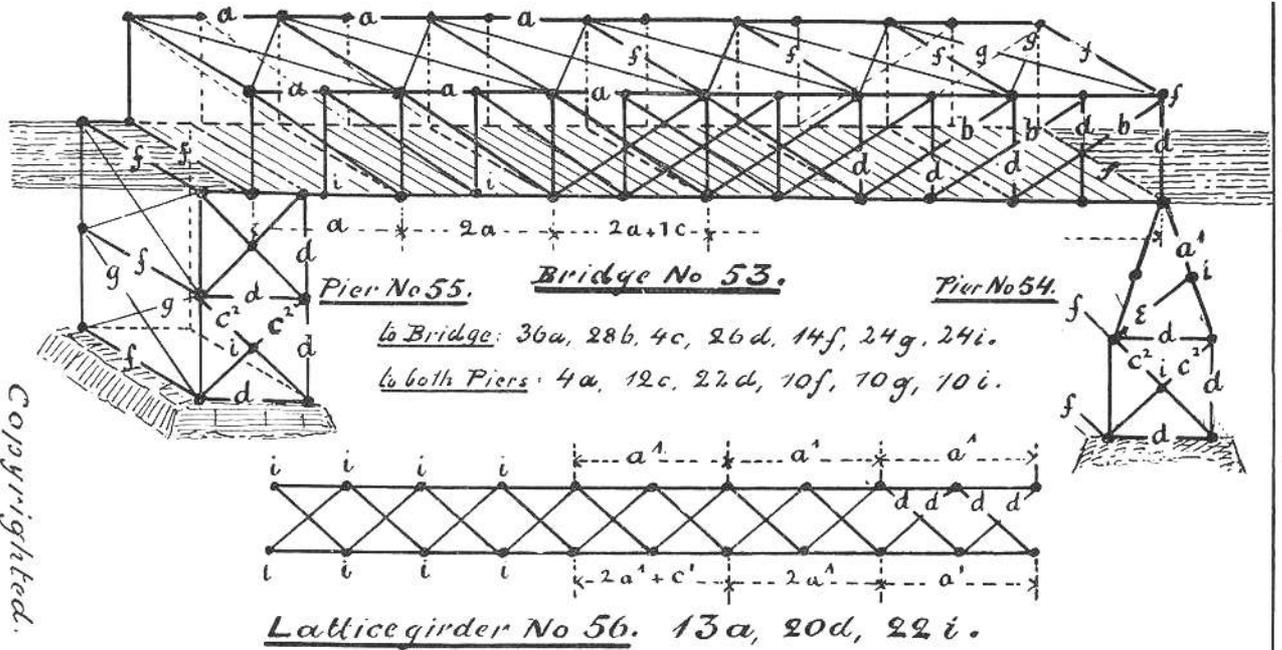
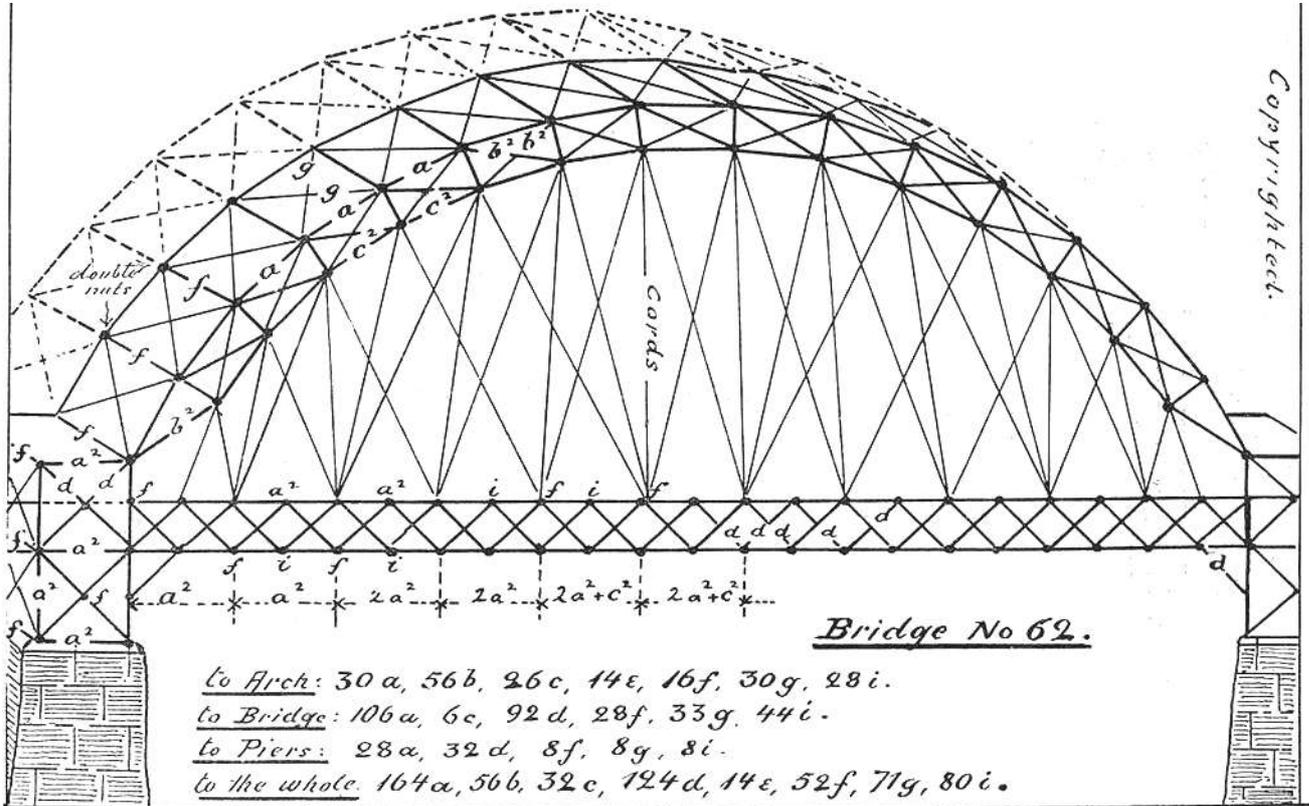
This is very surprising: the Keller system is very simple, without Nuts & Bolts, and the piers are made with stone blocks - I cannot see how such a large model could be built with this system and how piers or towers made with stone blocks could support such a large span. Moreover it is curious that both bridges were the same size, and that a German manufacturer built a model of an American bridge when there were many large bridges in Germany. It could be that they created a new system which was never manufactured, but I wonder whether the Kellers had made an agreement with Rumpf for selling his system in Germany. In that case the Leipzig Bridge was the Rumpf Bridge, but in the end his system was not sold by the Keller brothers.

IN CONCLUSION, THE PRACTICAL IRON CONSTRUCTOR AND DEMONSTRATOR was a completely new system with good quality parts which, except the Bolts, were easier to use. The models were well conceived and they adequately used the contents of the various sets; the supermodels displayed in the exhibition are amazing. Unfortunately it was not successful, these sets did not sell well since it is very rare to find them.

Starting from scratch, it was an imposing achievement to create THE IRON CONSTRUCTOR & then, only 5 months later, this greatly improved system. I am dumbfounded that so many events could occur in only 5 months. In this time: some sets of the first system were sold but defects in the parts & manual were discovered; a newcomer found various ways to improve the parts, wrote a manual with many new & intricate models; von Leistner left the management of the company; sets with the new improved parts were produced; and an exhibition with a lot of models, including supermodels, was staged. Building the large Suspension Bridge, using parts as cumbersome as the Bolts, must have required at least one month.

Was the price of the sets a factor in their lack of success? Their selling price isn't known but from the prices of the various parts, it is perhaps possible to have an idea of the cost of Set D. The total for the parts is \$5; it is likely that this was the





price of the set since it is cheaper to buy parts in bulk and that compensates for the cost of the box & manual. As an F set has more than three times the number of parts of set D, it might have sold for around \$15; and the smallest set, with one sixth of the parts of set D, might have been \$1. The firm which sold \$1,000.00 worth of this toy would have sold the equivalent of 200 D sets in two months. These prices seem reasonable when compared with those of 1910 US MECCANO outfits: \$2.00 for #1, \$4.00 for #2, \$6.00 for #3, \$10.00 for #4, \$22.50 for #5, & \$45.00 for #6.

Eitech Update The 2011 range of sets has changed considerably with 6 additions & 12 deletions since 2010 (see 44/1330). The main new set is a R/C F1 Racing Car (Fig.1), the main losses, the slightly skeletal Loco No.31, & the No.30 Fuel Cell outfit. The add-on accessory sets remain unchanged.

The new range of sets are (with the additions asterisked) 05,08,09,11*,15*,17,19,20,21,23,25,28*,34,35,45,47*,55,56, 57,58*,61,62,67,68*,72,73,74,75,80,83,84,92. The deletions: 03,24,30,31,46,53,54,82,87,91.

The New Sets No.11 has 320 parts to make a small tracked Excavator with one piece Cab Sides (as in Fig.2), or 2 other models. The featured model is an improved version of the one from the superseded Set 87. **No.15** has 270 parts to make the model in Fig.3 or 2 others. The Spoked Wheels may be a new part. One of the other models can just be seen on the part of the box lid in the background, and also the featured model's (Double Bent Strip) centre stand in the down position. **No.47** is a simplicity-plus Helicopter with a 7h diameter rotor. **No.28**, the F1 set, has over 300 parts including a 9V battery & 6V pack with charger. The radio is 27/40 MHz, 2-channel for the usual steering & forward/reverse. **No.58** is the Lorry in Fig.2, with the one piece Cab Sides. **No.68** is a small outfit for either a Tipping Lorry or Excavator, and again both have the new (?) Cab Sides.

The Deleted Sets with, in brackets, the Issue in which they were described. **No.03**, a 390 part set for a Tractor & Trailer (37/1107). **No.24**, a R/C set for utility vehicles (40/1224). **No.30**, the Fuel Cell set (30/885). **No.31**, the large Loco (27/795). **No.33**, The Eiffel Tower with no lights (41/1231). **No.46**, a simplicity Rocking Horse (44/1330). **No.53**, a small Lorry (35/1062). **No.54**, a



FIG.1

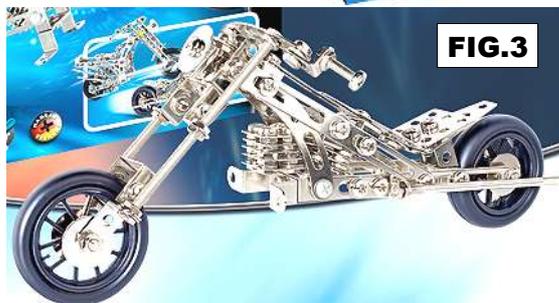


FIG.3

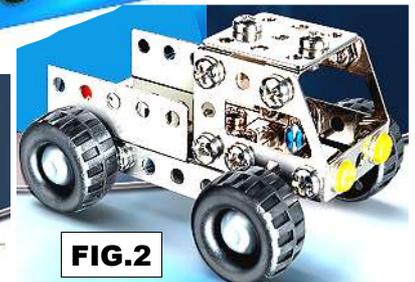


FIG.2

small Loco (35/1062). **No.82**, 3 simple Racers (37/1107). **No.87**, a set for a Digger & 2 other tracked models (31/910). **No.91**, a small 'interesting' Loco or 2 other models (41/1231).

CONSTRUCTION[12]: S12

OSN 45/1360

Snippet. 'New' Italian System: IL CARPENTIERE MODERNO

The set shown here was sold on the Australian Ebay and all that was said of it was that it dates from the 1950s or before, that the box measures 15.5*7.5", and that it is heavy. The lid includes the 'AFM' logo right, the maker presumably. (The 'M' could possibly stand for Milan, the printer's city as explained later).



FIG.1

The system's name, as might be imagined, means The Modern (or Up-to-date) Carpenter, and since the main parts look to be steel the choice of carpenter is perhaps meant to evoke images of frameworks. The text at the bottom of the lid's side panels claims that the simple & compatible parts allow the achievements of mechanics, carpentry & construction to be imitated perfectly.

It can't be seen whether the long parts are Rods or Tubes, but the latter probably because they scale at about 5½mm Ø. The small parts must include Connectors and as they do not seem to have any means by which they could be tightened, they may simply push onto, or clip over the Tubes. Other small parts probably include Bearings & Axle Stops.

The manual cover is as the centre section of the lid (but its



FIG.2



FIG.3

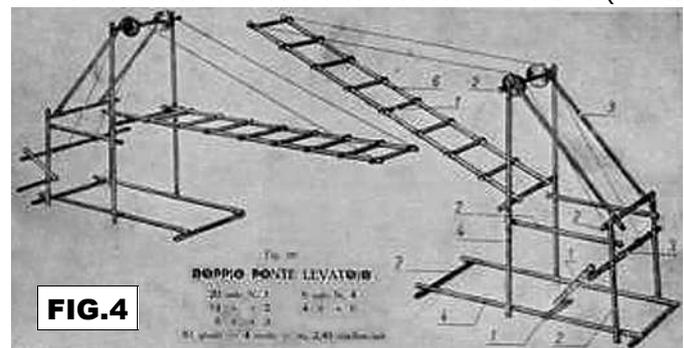


FIG.4

blue isn't faded) & is about the same size. In the model left it can be seen that Bearings are needed for the crank handles. I wonder if the Connectors can hold the Tubes tightly enough for the crank handle to function properly. The other model shown on Ebay was a Suspension Bridge on the page before the Lifting Bridge. Its ends & roadway are similar, but it has suspension 'chains' of Tubes running from the towers down to the centre of the span.

All that is on the back cover is 'S.I.?.? - V GOLFIERO - MILANO' across its centre (the second '?' could be an 'I') - probably the name of the printer since the initials don't match the letters in the logo.

IL CARPENTIERE MODERNO: S1

OSN 45/1360