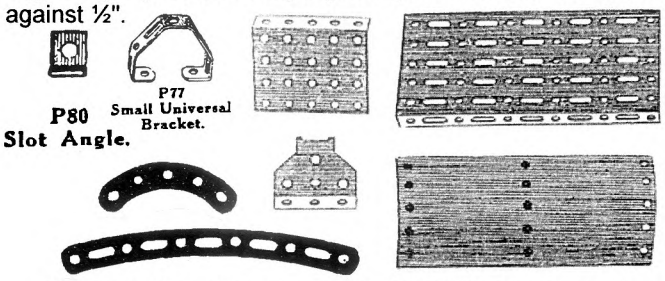
**STEEL ENGINEERING** The parts of this early 1920s U.S. system are shown in MCS - these notes were triggered by Josep Bernal kindly sending a photocopy of Instruction Book No.2.

First something of the history. STEEL ENGINEERING (S T) was sold by the Kelmet Corp., 200 5th Ave., New York, and accounts of its origins are given in the Jan. 1983 *S.Cal. N/L*, & in *Greenberg 1*, p28. They differ slightly but in essence the story goes that a group of toy salesmen decided to form a company to sell new products alongside their employers lines, and its name was made up from the initials of their surnames (except that a 'C' was changed to 'K', to avoid a possible 'cellmate' connotation). A.C.Gilbert was to make the new items at New Haven and probably controlled or owned the company, if not from the outset, certainly by 1923 or 1924. S E was patented in 1922 (though the patent hasn't yet been traced) and was on sale in that year. It is presumed that Gilbert was using S E to try out ideas for his New ERECTOR announced in 1924. No doubt S E died at that point, but the Kelmet Corp. was later used by Gilbert to market other products.

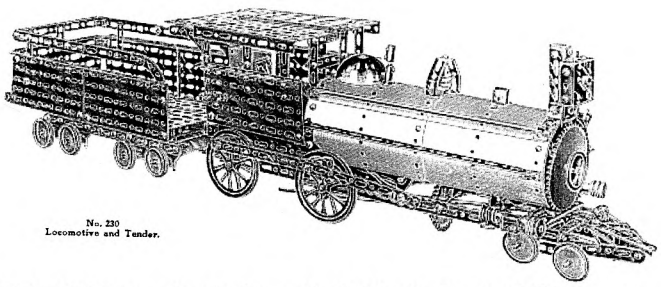
**The Parts** There were 40 in all and, with one or two exceptions, all the non-structural parts appear to be standard pre-1924 ERECTOR items. They included the 5 Axles, the 8 Gears, the 2⅞" Ø, 12-spoke, Grooved (Pulley) Wheel, and the N&B. Some retained their ERECTOR 'P' prefixed PN; others, including all the Gears, had the same PN prefixed by 'X', but what, if anything, this signified isn't clear. Of the exceptions the main one was the Pierced 24t Gear, with a ring of 8 face holes, which was listed as well as the standard (non-pierced) version. I believe that at the time the equivalent ERECTOR part had only 2 face holes and this was changed to 8 in 1924, when the non-pierced version was dropped. The other was the ½" Bolt which wasn't listed as an ERECTOR part until 1929 (and all the N&B PNs have the 'N' & 'S' prefixes that were only used post-1924).

12 of the 15 structural parts were new and all had 'P' PNs, which except for P79, were never used for ERECTOR parts. 3 or 4 of the new parts look just like later ERECTOR parts: the Car Truck (the Trunnion below) & Double Bracket, which were introduced in 1924 as P79 & M respectively; the Universal Bracket (below) which became #AC in 1927; and perhaps the P80, Slot Angle (below, left), which hasn't been seen but may be the Slotted Right Angle, CH, of 1924. If so it was quite similar to the pre-1924 Small Right Angle (also an S E part) except that it was 13/32" wide against ½".




The parts that did not enter the ERECTOR system were • 2", 5", & 11" Girders (Strips with the length measured between the centres of the end holes); and the Large & Small Curved Girders (above). The end holes of the latter are slightly elongated. The straight Girders had the alternate hole/slot pattern of the Large Curved Girder, with the holes at 1" centres and the slots ½" long o/a. A hole over the centre of a slot could be obtained by bolting on a 3h (MECCANO-type) Strip. The 2 Girders to hand (courtesy David Hobson) are 1.6mm thick and vary in width from 12.5mm for an 11" to 13.1mm for a 5". Holes are 4.3mm Ø. Both parts seemed to have been rather roughly made, but perhaps they had had a hard life. • 2 Single Flanged Plates, and a Curved Plate (all above). In the Loco top right, the latter appears to be 5" long between hole centres.

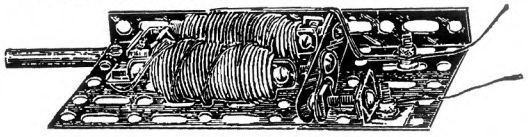
These parts were replaced in the New ERECTOR by the familiar braced Girders with formed edges (3 straight, 2½",

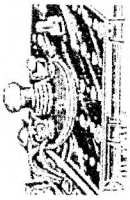

No. 220
Locomotive and Tender.

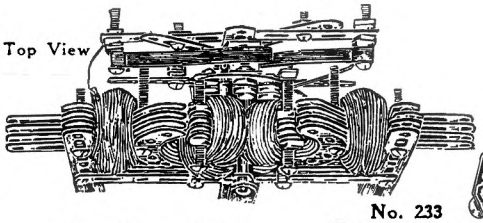
5" & 10" long, plus 2 Curved); 2 Single Flanged Plates, as in the Shaper on the facing page; and a 1-piece Boiler.

All the S E parts were painted black except the Gears, Trunnion, & small Brackets, which were nickeled.

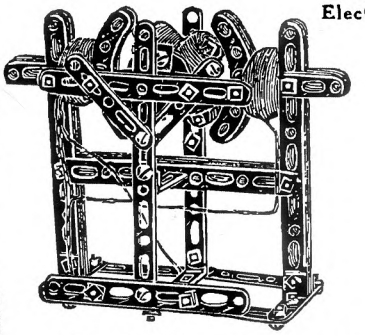
There were also some electrical parts in an electrical accessory set (see below), and the following can be seen in the manual models below: Insulated Wire (no doubt cotton covered) in the Motor windings & the coils in the Buzzer (wound around Girders); a Bulb & Bulb Holder on the front of a Tram; a Reflector, a Knurled Nut, & probably an Insulating Washer in the Searchlight; and a Brush Strip in the Motor (towards the bottom of the Top View, bearing on the Bolt shanks forming the armature.

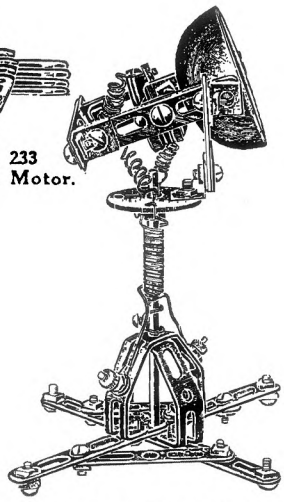

No. 217 Buzzer.





No. 233
Electric Motor.





**The Outfits** There were constructional sets Nos.1,3,5, 10,25 & 35, plus an 'Electrification & Illumination Set', No.20. MCS/FB also mentions Sets I & II, but no details are given. What looks like 'No.2' at the top of p5 in MCS should read 'No.25'.

No Set Contents are known but Sets 1 - 10 are illustrated on a 1922 Sears Roebuck catalogue page (kindly sent by Richard Symonds). Their prices range from 89c for the No.1 to $8.98 for the No.10, all a little below the Set No. In dollars. The main parts that can be seen in the No.1 are all the Strips except the Large Curved Girder, the Large Flanged Plate, 4 Pulleys (1¼" Ø), & a Gear Wheel. Extra in the No.3 are the Large Curved Girders, 2 Small Flanged Plate (shown white as if it was a nickel part), Universal Brackets, 4 Spoked Wheels, and a 3", 50t Gear. There was a P58 Motor in the No.5, and the No.10 included a Reversing Base for it, and 4 Trunnions.

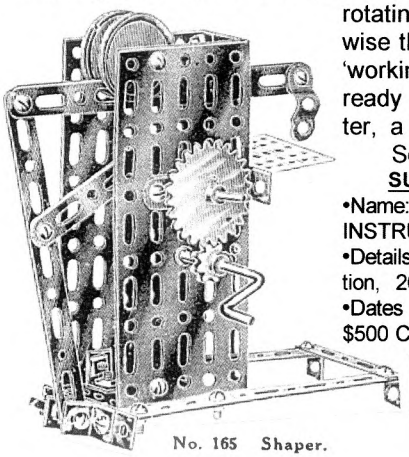
The sizes & shipping weights of the sets were; No.1, 8¼*12*1⅛", 2lb; No.3, 10*18*1⅜", 2¾lb; No.5, 10*18*2½", about 5lb; No.10, in a stained wood cabinet with hinged cover, 17*10*3", 10½lb.

**The Manuals** Josep's is described later and has models for Sets 5 - 35. It is said on the cover that models for Sets 1 & 3 are in Instruction Book No.1. The models are generally of fair appearance with some much better than

average, particularly where good use has been made of the Curved Girders. Mechanical aspects do not usually extend beyond simple Cord, Chain, or Gear drives, and none of the Vehicles has any form of steering. Many of the larger models are Motor driven. It is hard to follow the construction of some of the models. As a simple example of this, in the rather nice Pile Driver shown below (full-size), the tupp is raised by the Worm on the f&a horizontal Shaft driving the Gear above it, and then falls when the Worm is disengaged to the position shown. But I can't see what supports the RH end of the Worm Shaft, or how it is moved. The same method of Gear engagement is used in the Ship Crane below, and was used in a number of ERECTOR models. In the Crane current for the Motor passes through a Brush Strip at the top of the tower. In the Loco (left), the steam dome is the Reflector & the main wheels are driven by gear plus chain drives from a Motor inside the front of the boiler.

As might be expected many of the models were reworked and included in New ERECTOR manuals. One of the more interesting of the smaller S E models, a Shaper, is shown below (left) together with its ERECTOR equivalent. In the latter the ERECTOR Girders look out of place as mechanical parts but the Strips (13/32" wide with holes at ¼" pitch) are very neat & very useful. Other large S E models which were later transformed into well known New ERECTOR models included the Crane below; a Ferris Wheel, with 4 gondolas hung from a 2' Ø circle of Large Curved Girders; and a Coal Conveyor.

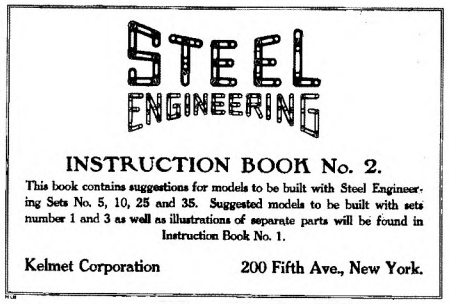
The Set 20 electrical parts are mostly used to light up the larger models and in some cases to lead current into rotating assemblies. Otherwise there are, as well as the 'working' electrical models already mentioned, a Volt Meter, a Telegraph Key, and a Sounder for it.



No. 165 Shaper.

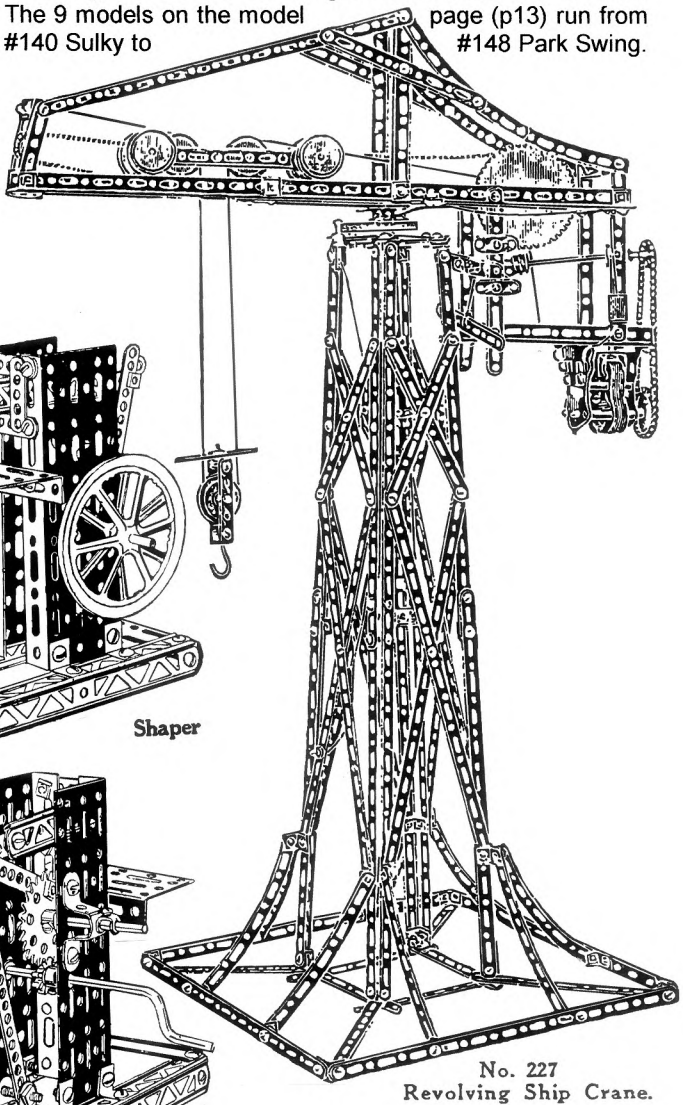
**SUMMARY OF MANUAL**

•Name: STEEL ENGINEERING INSTRUCTION BOOK No.2. •Details of maker: Kelmet Corporation, 200 Fifth Ave., New York. •Dates &/or Ref Nos: 1922-23 $500 Competition ad on BC for entries from 1/2/23 to 1/3/23; M922 on FC. •Page size: approx. 250*173mm. •No. of pages: 32 inc covers. •Language: English. •Printing: line drawings. •No Set Contents / Parts List. •Sets covered: 5,10,25,35, & 20 with Std Sets. •No. of models for each set: 21,12,17,6,18. •Name, Model No., Page No. of first & last model of each set: 5: Universal Milling Machine,159,2; Trolley Repairer,181,4. 10: Small Factory Truck,182,5; Gang Plank,193,7. 25: Park Swing,194,8; Lathe,210,13. 35: Merry Go Round,211,14; Electric Windmill,216,19. 20+: Buzzer,217,20; Electric Sign and Flasher,234, 31. •Other notes: •Details from photocopy. •Models 164 & 179 are back views of Model 165 & 180.

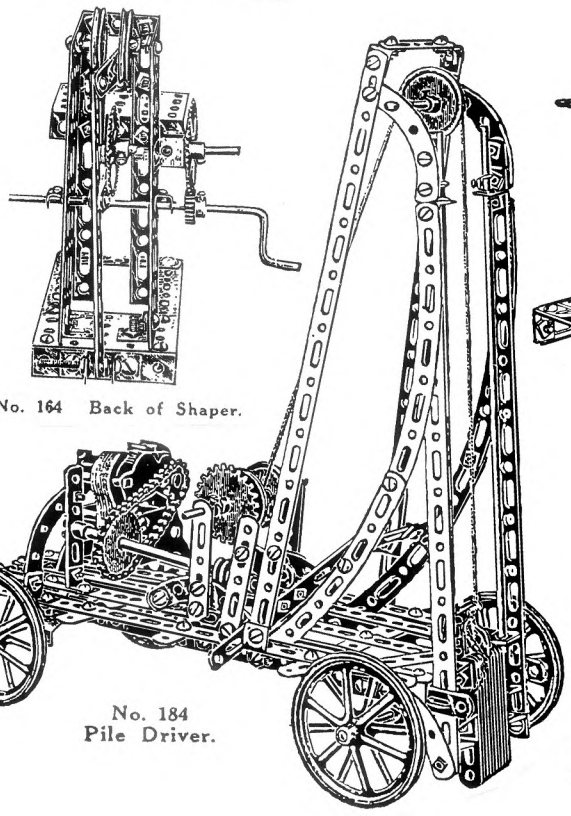



Two other manuals are known. The No.2 cover in MCS is broadly similar to the one above but has 'Patented Aug 22 1922' under the name; 'The Steel Construction Toy with the Curved Girder' instead of the notes about the models/sets; 'Build | Ferris Wheels | Steamboats | Bridges | Engines' to the left of the name; & 'Mechanical Toy Engineering For Boys' to the right. Also the double outer frame is thicker, and there is no 'M' PR, unless it has been lost in copying. This may be an earlier version of the No.2 but the 2 MCS model pages look identical to those in this manual.

The other is a No.1 and the cover & one page of Set 3 models are shown in the April 1985 *S.Cal. N/L*, p4. The cover has the patent date under the name, and an 'M' PR, with an unreadable number. Its RH half is filled by the Set 35 Ferris Wheel; the LH has 'INSTRUCTIONS No.1' under the name, together with some text which mentions the 'curved girder' but has nothing on which sets are covered. The 9 models on the model page (p13) run from #140 Sulky to #148 Park Swing.



No. 227
Revolving Ship Crane.



No. 184
Pile Driver.



No. 164 Back of Shaper.



Shaper



Shaper, Back View

on the AMI-LAC, Eitech, & Dickie-Schuco sets in the next Issue.]

4. On **PRINCE WILLIAM** (23/679), Tony Press sent the photo below of Jack Little's Loco & Tender, standing in front of the Loco's box. The main parts, including the Loco's Undercarriage, are green, with red Wheels, Boiler Supports, Coupling Brackets, and Saddles for the (brass) Chimney & Steam Dome.

5. Thomas Morzinck sent the photo below of Dr. Griebel's **KÖSTER Goods Train** (23/679) on 0-gauge track. The sides of the Loco are green and those of the Wagons red. The Loco roof is grey and all the Strips are black.

6. On the claimed Aug. 22 1922 patent for **STEEL ENGINEERING** (23/666-7), David Hobson has found that the only 'toy' patent of that date was No.1426376 to A.C.Gilbert, but it related to 'square girder construction', not STEEL ENGINEERING. It was originally filed on 2 Feb. 1915.

7. On the **AMI LAC** Gearbox Plate (23/659, John Hanby wrote that it wasn't available when he asked Guiseppe Servetti about it in around 1968. The MÄRKLIN part was shown in a June 1967 List but by 1969 it had been deleted, along with over 20 other parts.

8. From Dan Farmer, St Paul, Minnesota, 'Hello! I just found your website. My grandfather, Weston Farmer, created the **BUILDO** erector set back in the mid '40's. My father has told me stories about how he & his four brothers would sit around creating the models that were eventually used in the manual. Quite apart from BUILDO, my grandfather was a world renowned naval architect & writer. He even worked for Walt Disney in the early days, and I recall actually throwing out some Disney 'cells' as a teenager when helping my grandparents clean out the summer cabin!

The reason I went online looking for references to BUILDO is that my father just sent me a complete BUILDO set. Of course, BUILDO was a small player, with Gilbert at the top of the heap, and ironically I think it was my grandfather who bought me the Gilbert ERECTOR set I played with as a child. But I'm pleased to find that BUILDO is still remembered and mentioned on several web sites.'

[BUILDO was a small system of some 36 parts, but with some unusual features. It is shown in MCS and I hope to include some notes on it in OSN at a later date.]

9. From Jacques Pitrat. 'I have found an ad for the French system **MOBILO** in the 18 December 1919 issue of the weekly 'Sciences et Voyages', and it is likely that the system had recently come onto the market at that point.' [See 20/581 for a note about MOBILO Wheels.]

10. From Orion DreamDancer. • Photos of a **Super GIRDER BILT** Set which match the one described in 19/555 except for the N&B. They have the same 4-40 thread, but the Nuts are brass (again ¼" A/F), and the Bolts, 5/16" & 7/8" u/h, are steel (perhaps brassed) with respectively round & fillister heads. [A set shown on ebay seemed very similar except that the background colour of the tubular container was light brown instead of the red of Orion's set & those described in 17/467 & OSN 19. No Spanner could be seen and the Screwdriver was a 'commercial' type with a clear yellow plastic handle. The Bolt heads were too blurry to be clear.]

• 'The manual from a **STEEL TEC** No.4 Set corresponds to the one mentioned in 11/277, and is #7021 dated 1993. The Dump Truck is the only model in the No.6 which uses the 6*8 & 6*5h Plates in that outfit, and they are not in the No.4 Set or the #7021 manual.'

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MCS Amendments, List No.9 [1 Sheet]
BIG-JOY: X1.1,5,6,4/5a/6a [2 Sheets]
BILD-A-SET: X1.2/5,4/5a/6 [1 Sheet]
CONSTRUCTOR [0]: X1.1,2,4,5 [2 Sheets]
CONSTRUCTOR [1]: X1.1,6,a,b,3/4c [3 Sheets]
ELECTRIC: X1.7,a,b,c [2 Sheets]
MECHANIX [3]: X1.1,2,3/4/6,5 [2 Sheets]
METALCRAFT 'LYONS': X1.4b/5a,5b/6a,4c/5c,5d/6b, 5e/6c,5f,4d/5g,7 [4 Sheets]
MICKEY MOUSE: X1.1,2,5,7 [2 Sheets]
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PRIMUS LOCOMOTIVE: X1.3a/4a [1 Sheet]

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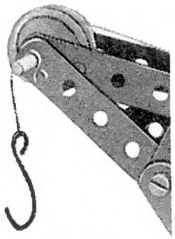
**Correction** The transliterated name BOENNAYA in 25/717 & 718 should read VOENNAYA (my thanks to Don Redmond). This set in question is no doubt similar to the one mentioned in 24/714, though some details are not identical.

## ITEMS FROM LETTERS

1. From Thomas Morzinck. • On the **ANKER Metal Parts** (25/730) The set with the 1897 parts offered by Richter in that year cost (a very expensive) 60 Marks. One year later it was deleted. Tobias Mey mentioned in his book *Zum Bauspiel*, that the Keller brothers - former employees in Richter's factory - sold their own Bridge Set from 1897 using preformed metal parts. In their advertising literature the Keller brothers called Richter's 1895 Bridge Set 'a screwed idea'.('eine verschraubte Idee' in German). [The **Keller Set** may be even earlier. A UK patent No.5781 in the names of Georg & Paul Keller is dated 1890, and the parts in it (owned by David Hobson) correspond to those believed to be from a Set which was awarded a prize at a London exhibition in 1891, and also to those in a photo of a Bridge made from the 1897 Set above. The main elements are Straight & Curved T-section Girders, joined by Flat Strips which push into the double wall web of the Girders to represent uprights & bracing. A George Wetzel sales list sent by Don Redmond has an illustration of a Keller Bridge Set called **DIAMOND BRIDGE BUILDER**, with 4 children ('one Chinese, one American Indian, one white, & one Ethiopian') looking at a Church made from blocks, and a Bridge with block piers and a span of the metal parts.]

• Tobias mentioned that the early **DUX** parts (c1938) look like the Julius Weiss parts from 1892.

2. From Don Redmond. • More on **NECOBO**. The parts mentioned in 24/714 were from a lot which are probably a large part of an early No.4 Set, plus some later parts, and some which may or may not be NECOBO. The manual with them covers Set 0-4 and its parts list goes up to only PN 99, so is earlier than either of the MCS lists, and fits between the 1st & 2nd manuals described in 4/57. The 11 & 25h Strips have large-radius ends but there are also 11h, and 3 & 5h, with half-round ends. There are 2 sets of 1" Pulleys: 3 have red painted steel discs and very fine (small, round) peening on the brass boss; the other 4 have aluminium discs and steel boss with very deep conical peening. The aluminium Pulleys had a set of fat white soft Rubber Rings of 5mm circular form, 35mm o.d. The red ones had black rubber Tyres with a tread of 5 circumferential raised lines & radial raised bars on one sidewall. There was also one Tyre about 7mm thick, 38mm o.d., with NECOBO in raised lettering on one side. The aluminium Pulleys are suspect since there were also red Loose Pulleys. All the Gears are Mod.1 and the 60t is the early unperforated type. The Flanged & Triangular Plates, and the Face Plate are red. The Flexible Plates are aluminium painted dark blue. Under a red & ivory daub of enamel the Windows (#126) seem to have been painted silver. Strips, A/Gs, & Railings are dark green, darker than the early MECCANO dark shade. The red is quite light, between Meccano's light & medium. The parts have a surprising range of thickness. 25h Strips are 1.38mm; 11h Strips 1.0mm; Railings .84mm; 5*4h Triangular Plates 1.18mm; Windows .81mm; but Trunnions are only .67mm. Two types of Collar were found, both tapped 5/32" BSW. One is 10mm Ø, 7mm thick, double-tapped, and the other 8.5mm Ø, 6.5mm thick, & single-tapped. Two later parts are the Cone Pulley, #176, machined from brass with a concave rear (boss) face, and the Eccentric, #180, which has a brass arm/loop held between two red steel discs by a brass boss and a matching brass stub, both peened with a very deep, conical bottomed recess. [A small lot of later Strips, Girders, & Trunnions (up to PN 195C but none more than 9h long) are also the very dark green – the Girders are about .8mm thick, the Strips 1.05mm, and the Trunnions .85mm.]



In a later letter Don pointed out that the Hook #90 hasn't been seen, and isn't illustrated in any parts list, but in the manual models is shown as the wire type right. Also it seems likely that the Faceplate #83 with the 2 rings of 8 holes (see 24/714) is an early part because the 6cm Disc, #82 (a Faceplate without a boss), appears thus in several of the manual models. Later, as shown in 4/59, both had the pattern with radial slots.

• On **STEEL ENGINEERING** (see 23/666), the wings of the formed Collar, X37, are near circular in shape, as opposed to the ERECTOR rectangle.

• In response to a question to Don about **WISDOM** (to include also CONSTRUCT-O-STEEL & CONSTRUCTION MODELS), he wrote that there are two patterns of slotted holes in Trunnions & 5*11h Flanged Plates. Most have rounded ends but some have large-radius 'BRAL' ends. The length o/a is 6.4mm for both. All the slots in known examples of the other sizes of Flanged Plates have rounded ends. Note that the Flat Trunnion is not made from the same blank as the Trunnion, and has no slotted holes. On colours, the 5*11h Flanged Plate is known in light, medium, & dark* blue, and medium, & dark* red; the Trunnion in medium, & dark* blue, and in two shades of dark red*. The asterisks denote a lacquered finish, with a metallic look.

3. From Tim Edwards. On Chinese **MECHANIX** (see 24/710), there is also a 001 Set with 68 parts, price £3.50. [A 002 Set with 108 parts has also now been seen.]

4. Josep Bernal wrote that **BRAL** is no longer being made. [The BRAL web site, www.bralsystem.com has just a home page with 'stiamo ritornando' on it – we will return? Let's hope so.]

5. From Jack Little. • On the **Day patent** (22/637), Jack sent a copy of the original Australian patent (No.6000/22, accepted 27th Nov. 1922), with added changes to the figures arising from an Application for Amendment on 5th August, 1924. The text is similar to the UK version but not identical and the original figures differ too in detail. Fig.1 below shows

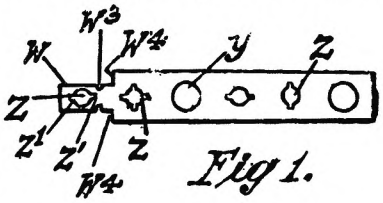


Fig 1.

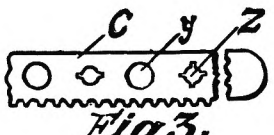
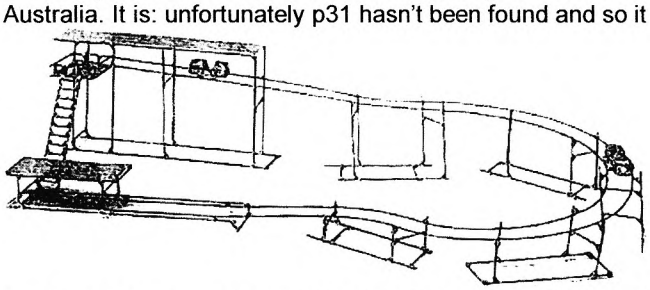


Fig 3.

a different pattern of holes for example, and the Strip in Fig.3 has a serrated edge & rounded end. The purpose of these features isn't explained. The changes made to the figures in 1924 took the form of overwriting some with a large cross and writing Cancelled & 18/11/24 alongside. 3 of the 4 cancellations are of the parts shown in Figs.8, 9, & the righthand end of Fig.4 , in OSN 22. The parts in question are made in the same way as the EZY-BILT Clips (22/636) but whether that had a bearing on the matter isn't known. The fourth change was to delete the slitted end of the Fig.2 Strip, though similar ends with a slit with centre hole remain unaltered.

• Also from Jack, the cutting below from the Nov. 1947 *Sportsgoods, Toy & Canvas "Retailer"*, which confirms that CLIRO (described elsewhere in this Issue) was sold in Australia. It is: unfortunately p31 hasn't been found and so it



**A Scenic Railway made from the Schofield Model Building Set. Further details of this set appear on Page 31.**

**Snippets. STEEL ENGINEERING** These add to the notes in 23/666. The system was announced in an ad dated January 1922

A dealers brochure from, probably, later that year shows sets 1, 3, 5, 10 & 25. Also the Electrification & Illumination Set 20. There is a photo of each but they are too blurry to see much detail. Their size, weight, number of parts/models are given as: Set 1: 12½*8⅜*1"; 1lb.11oz; 92/109. Set 3: 18¼*10¼*1½"; 2lb.13oz; 160/159. Set 5: 18¼*10¼*2½" (2 layers); 4lb.6oz; 192/180. Set10: 14¾*8¾*3¾" (wooden with tray); 11lb.6oz; 273/192. Set 25: 18¾* 11*3½" (wooden with tray); 17lb.6oz; 1058/209. Set 20: 18*10¼* 1⅜"; 1lb.3oz.

Sets 10 & 25 include the Motor. All but Sets 1 & 20 have 4 Grooved (Spoked) Wheels. The parts in Set 20 include miniature Lamps, Wire, Sockets, Contact Strips. Sets 1 & 3 have the Book 1 manual, Set 5 Books 1 & 2, and Set 10 the 'big Books of Instruction'. Nothing is said for Sets 20 & 25.

Fig.2 shows the parts in a No.3.

As mentioned in OSN 23 a Set 35 was later added to the range, but no further details of it have emerged.

Fig.1

Patents are listed below the base of the Big Wheel with 'Nov. 18, 1919' and 'June 1, 1920' on all; 'Other Patents Pending' on some, but Mar. 13, 1923 instead on others. One Ebay ad for a No.10 set claims 'Patented Aug. 1922' but probably this comes from the manual cover, as in the MCS one mentioned in OSN 23.

**The wooden boxes** have just a small label (Fig.3) on the lid's bottom right corner. The Set No. is on the inside of the lid at bottom right.


Fig.2

**The Manuals**. Fig.4 is the cover of the No.1 manual, as described in OSN 23. It has 16 pages with models for Sets 1 & 3.

The B&W cover of a No.2 manual was shown in OSN 23, and a comparable one was described there. A further No.2 is shown in Fig.5, and another ebay photo shows it open displaying the (blank) inside front cover and the first inside page. The latter is identical to the 'cover' shown in OSN 23, so it may be that all the B&W 'covers' are actually first pages. In any case the Fig.5 manual has 32 inside pages and they almost certainly match those in the OSN 23 Manual Summary.

Fig.3

**The cardboard boxes** are black with a label similar to that of the No.5 in Fig.1. This basic design was used on all the cardboard boxes but the relative positions of its elements vary a little from set to set. Also the colours vary in intensity, at least in Ebay photos. The longer lid aprons have 'REAL SPORT FOR REAL BOYS' along them; the shorted ones, 'STEEL ENGINEERING' followed by the Set No.

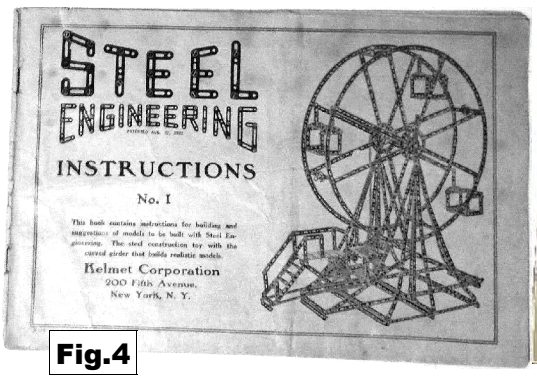


Fig.4

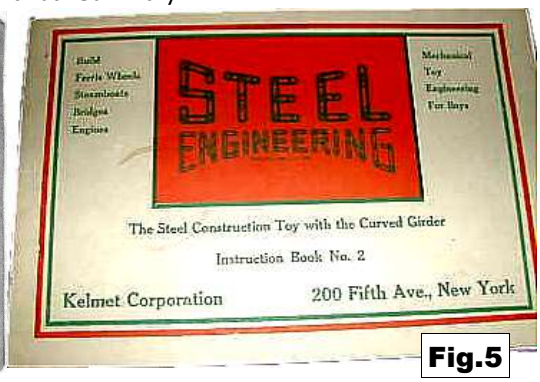


Fig.5

**STEEL ENGINEERING [1]: S1** **OSN 53/1636**

**'New' System: AUTO-METALLBAUKASTEN** Thank you to Urs Flammer for sending the photos of the lid below, and of the parts right. The box is about 20½cm long and the Wheels are made from fire switches. The later probably indicates that this Set was introduced soon after WW2. The words on the lid bottom right translate as Educational, Entertaining, Stimulating (or Exhilarating). The words under the trademark right may just mean 'Take Note, Trademark'.

Fig.2

Fig.3

Fig.1

**AUTO-METALLBAUKASTEN: S1** **OSN 53/1636**