

# OTHER SYSTEMS NEWSLETTER

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OSN 18

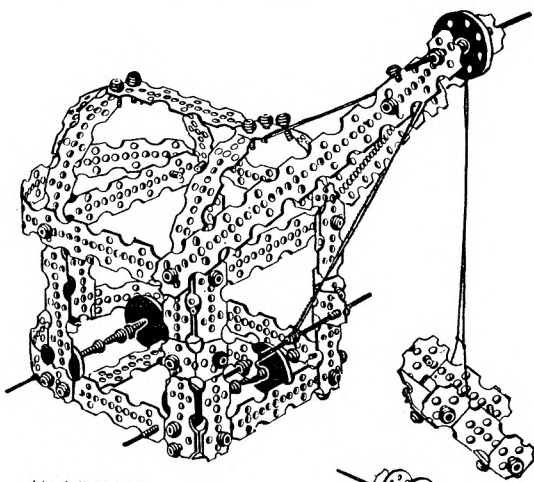
APRIL 1998

**EDITORIAL** I've had several requests for a review of the systems mainly intended for use by industry rather than as toys. Until now I'd never put pen to paper because I felt that insufficient material was available to do justice to the subject. But with the help of several readers I've gradually acquired some FAC literature, and when Colin Reed offered to lend me his large FAC set I couldn't resist trying to write something of the parts and their history.

One point I hadn't appreciated before was how many new parts were introduced in the early 1960s, together with some important changes to the existing ones. The MCS entry for FAC shows only the parts prior to these revisions, and since FAC is one of the more interesting

systems technically, I have shown all the parts current after the changes in Extra Sheets. The illustrations have been reduced in size to keep the number of new Sheets to a minimum, but they are clear enough to be photocopied up again if necessary. The contents of Sets X1 & X2 were not to hand when the article was finalised but are included in the new MCS material.

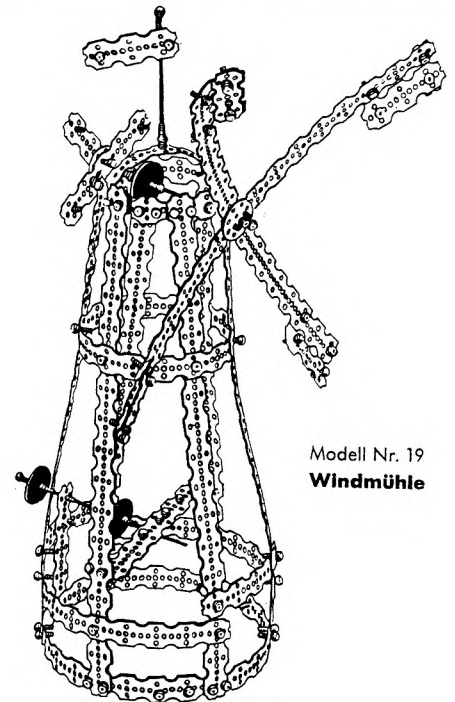
I've some literature on AUTOMAT, another important industrial system, and I hope to write some notes on it in the next Issue. I'd be glad to hear from anyone who has material that they haven't already brought to my attention, particularly from the first Swiss phase, or who can provide notes on the parts, or has knowledge of using them.



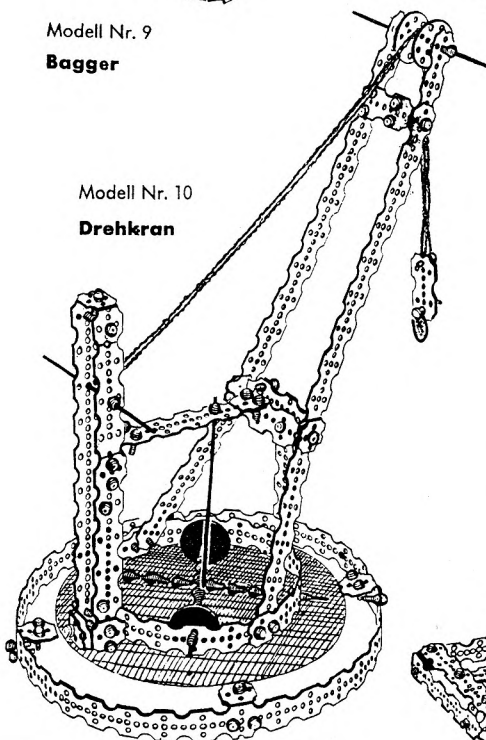
Modell Nr. 9  
**Bagger**

AKRON

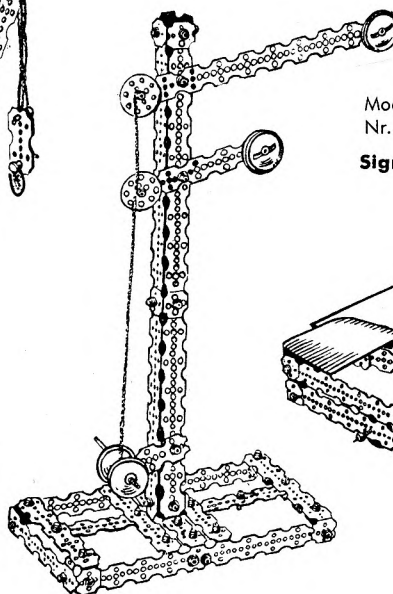
Please see p516  
for details of this  
unusual German  
system.



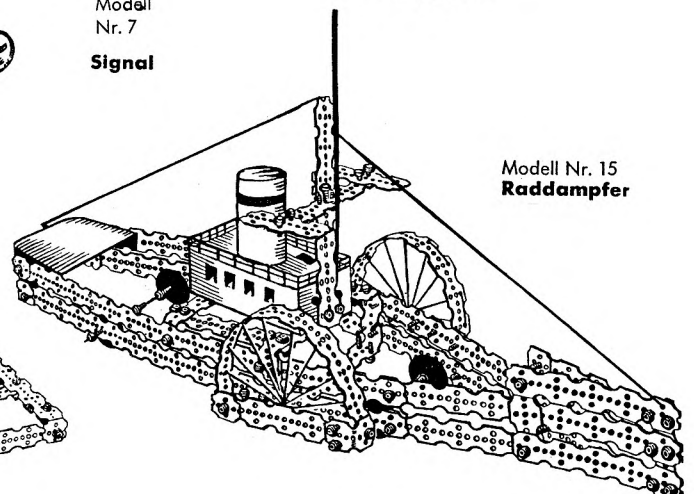
Modell Nr. 19  
**Windmühle**



Modell Nr. 10  
**Drehkran**



Modell  
Nr. 7  
**Signal**



Modell Nr. 15  
**Raddampfer**

**'New' System, INSTRUCTO**

**- THE MASTER TOY** Kendrick Bisset recently obtained a set of this hitherto unknown American system, and kindly sent photos, details and a copy of the manual. Frameworks are made from 4 different lengths of 1/4" steel Tube, rolled from tinplate, that push into, or onto, 6 types of Connector. In all there are 16 different parts.

The cardboard box is 387\*285\*46mm and the label on the lid is similar to the manual cover opposite, but enlarged to fill the area, and printed with red & white panels on a blue ground, with black lettering. Small, open, fixed card boxes subdivide half the bottom of the box to house the small parts, while most of the Tubes are in the other half. Above the Circular parts are clipped to a dark card which is hinged to the box along one edge. The parts found are as follows:

- 6 each of 1", 2", 5" & 9" long Tubes, nominally 1/4" Ø, with the joint not fully closed up (intentionally to fit some of the Connectors).
- 4 each of 6-spoke & 8-spoke Connectors (see Figs.1,3 below). Their outside 'diameter' is 1 1/2" and the Tubes spring onto the spokes. They are made of 2 similar stampings, held together with tabs bent over between the spokes, and the ends of the latter are grooved in the style of a pulley.
- 15 Square Connectors (Figs.19,21). They slide inside the Tubes with the slot in the Tube sliding over the base of the Connector, and they can be positioned anywhere along the Tube's length.
- 8 Eye Connectors which slide into the Tubes, see Fig.8. The 'eye' hole is .27" Ø.
- 4 Straight Connectors, 1 1/4" long and 1/4" Ø, turned from the solid with the last 1/4" at each end reduced to .23" Ø to fit into the Tubes.
- 4 Elbow Connectors (Fig.17) which look as if they have been bent from the Straight ones.
- 2 Perforated Discs, 2 1/4" Ø, see Fig.14, with circles of 6 and 12 1/4" holes.
- 4 each of 1 1/4" & 2 1/8" Ø Pulleys without boss (Fig.8), rather like M22a but with a wider groove, pronounced belting at the centre, and 4 holes in the face, 1/4" in the large one but much smaller in the 1 1/4".
- The 4 8-spoke Connectors are fitted with rubber Tyres which seat in the grooved ends of the spokes. They are 2 1/4" o.d. and have MASTER TOY CO / LOS ANGELES moulded into the sidewall. Fig.11 shows a Tyre being taken off but



those in the Set have gone hard and can't be removed. Some of the models in the manual show the 2 1/8" Pulleys fitted with Rubber Rings but none were found in the Set.

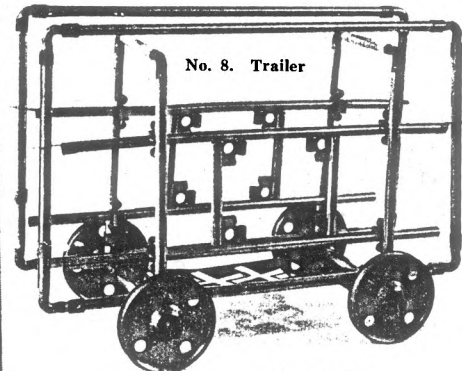
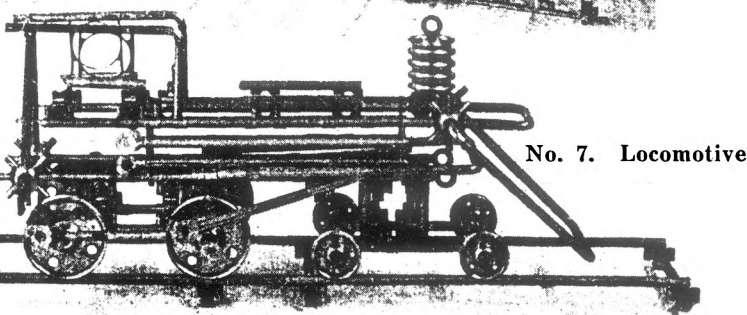
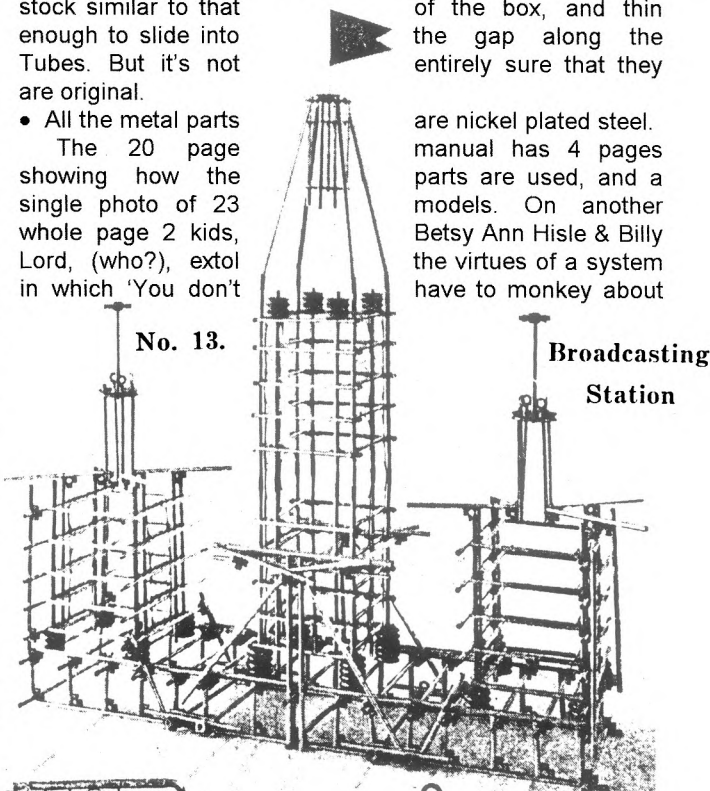
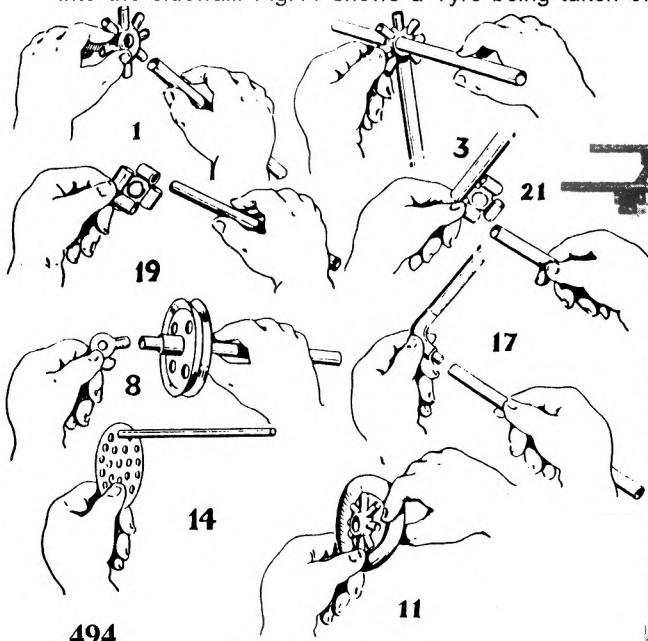
- 13 Sleeves, 5/16" long, which fit over the Tubes, and can act as collars, see Fig.8. They may be meant to close up the Tubes so that

the Pulleys turn freely on them, & are also used in some models to strengthen the joints, as in the Trailer shown later.

- 8 Plates about 2 1/4\*5 1/2", made of natural colour card-stock similar to that enough to slide into Tubes. But it's not are original.

• All the metal parts The 20 page manual has 4 pages showing how the single photo of 23 whole page 2 kids, Lord, (who?), extol in which 'You don't

are nickel plated steel. manual has 4 pages showing how the single photo of 23 whole page 2 kids, Lord, (who?), extol in which 'You don't have to monkey about



with screws and bolts like you do with other sets', and the photos of the pair of them are also on the cover. The models range from the very simple Picture Frame to the quite large Broadcasting Station. Some include the Plates already mentioned, in more than one size, while others use panels, not in Kendrick's set, which seem to be the waste from the Connector stampings. Examples can be seen as the base of the Trailer, and as the side window frames of the Loco.

The firm on the box and manual is the Master Toy Co., Los Angeles, California; there's no firm indication of date but the clothes shown, the model of the Broadcasting Station, and a claim that 'INSTRUCTO is the only mechanical building toy manufactured that does away with screws, nuts and bolts', points perhaps to the early 1920s. There's also no indication that there was more than one outfit, and if

that's the case, either there were originally many more parts in Kendrick's set, or extra would be needed to make many of the manual models. It is said in the manual that additional parts could be bought from dealers or by mail.

**SUMMARY OF MANUAL** •Name: INSTRUCTO THE MASTER TOY. •Details of maker: Master Toy Co., Los Angeles, California. •No dates/Ref Nos. •Page size: 9\*6 1/2" deep. •No. of pages: 20 inc covers (no page nos.). •Language: English. •Printing: B&W with photos of models, & red outer line on cover. •No Parts List or Set Contents. •Sets covered: not stated. •No. of models: 23. •Name, Model No., Page No. of first & last model: Truck,1,5; Du Jigger,23,11. •Other notes: pp2(IFC),4,12,19,20(OBC) blank; pp14-17 show construction details; PRINTED IN U.S.A. BY MAC PRINTING COMPANY / LOS ANGELES on p18; a Du Jigger is shown as a 2-wheel cart carrying 2 dolls sitting on cross bars, one above the other.

**MASTER BUILDER** After the notes in 16/450 Kendrick Bisset kindly sent a copy of a newly acquired MASTER BUILDER manual, intended for the smaller sets.

**SUMMARY OF MANUAL** •Name: THE "MASTER BUILDER" •Details of maker: As 16/450 but over stamped Removed to BUSH TERMINAL, BUILDING No. 6, BROOKLYN, N.Y. •No dates/Ref Nos. •Page size: 175\*255mm deep. •No. of pages: 16+covers. •Language: English. •Printing: line drgs of models; cover as MCS. •Page No. of Ill. Parts & highest PN: 14,57. •Page No. of Set Contents & highest PN: 15/59. •Sets covered: 10,25,50,1. •No. of models for each set: 22,10,10,10. •Name, Model No., Page No. of first/last model of each set: 10: Easel, 1,3; See Saw,22,5. 25: Bed,23,5; Sand Sieve,32,6. 50: Carpenter Bench,33,7; Bleriot Monoplane,42,8. 1: Delivery Conveyor,43,9; Traveling Crane,52,11. •Other notes: No.2 Set boat models 53-57 on p12; prices of sets, as MCS, on p16, Speeder motor shown on IBC.

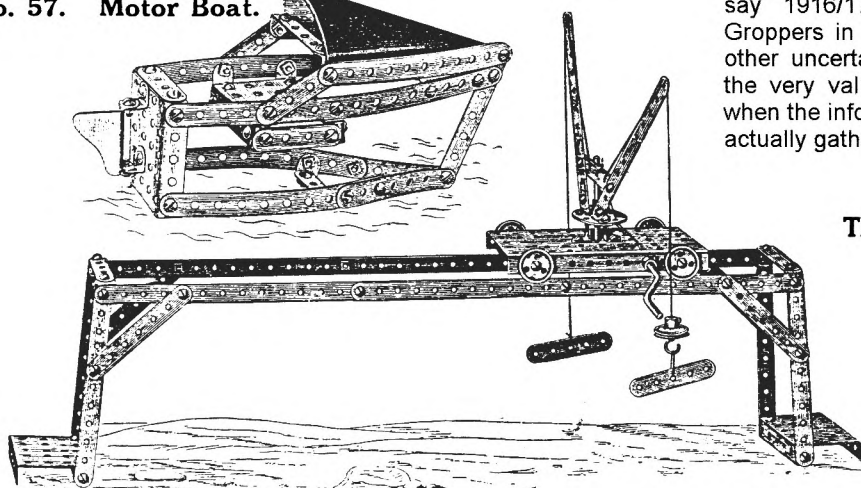
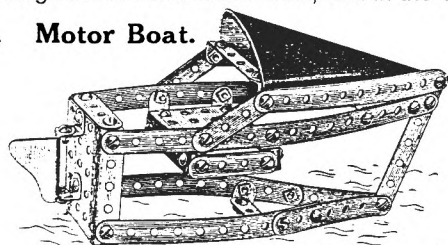
The general form of this manual is probably similar to the 20 page thicker one from which the MCS pages were taken. It is probably not the Pamphlet of Instruction, PN58, which was in Sets 10-50. First because the latter was 'Free', and that seems inappropriate for a 16-page item, when the 36-page standard manual was 25c. Also although the 5 No.2 models shown are clearly only a sample, the 10 No.1 models are the number claimed for that Set at the time.

There are more models in this version than in the earlier comparable manual described in 16/450. Many are the same, or in the same vein, but, particularly for Set 1, a few good new models are included. For example the Traveling Crane and Pile Driver below.

The 5 No.2 models consist of a Barge and 4 Boats of various sorts. It is claimed in a panel that 'Marine construction .... is a feature of MASTER BUILDER' [elsewhere Bridge & Auto Truck construction were also claimed as specialties]. Details of the Rudder, PN20, not clear in the Illustrated Parts, can be seen in the Motor Boat below - it has lugs top & bottom so can be pivoted on the Angle Brackets at the stern.

No models are shown as being for Set 20, nor is it mentioned in a panel on the back cover in which the number of models that can be built with each outfit is given. It is though in the Price List of sets, and in the Set Contents.

**No. 57. Motor Boat.**



**No. 52. Traveling Crane.**

Also on the inside back cover is an illustration (below) of the Speeder motor. It is obvious similar to the ERECTOR P58 but the sideplates differ in detail.

The printed address in the Manual is the 468 Broadway one but rubber stamped over it is: Bush Terminal, Building No.6, Brooklyn, N.Y.

Kendrick has also tried to trace the history of M B using the Thomas' Register of all U.S. toy makers, and the Industrial Directory of New York State. There was an Acorn Manufacturing Co. and it is listed in 1913 under 'sheet metal work of copper, brass & aluminum' at 33-37 Bleeker Street, New York. In the next available issue for 1916, Acorn is under Toys at the same address. It isn't in the 1917 edition but reappears from 1918 to 1923/24 (there was no 1919), but at 34 34<sup>th</sup> Street, Brooklyn. It isn't listed in 1924/25.

The other name mentioned in OSN 16 is M. Gropper & Sons, and they first appear in 1917, under Toys, at Bush Terminal, Brooklyn. The 1918 entry is the same but from 1920 through 1923/24 their address is the same as Acorn's in Brooklyn. Again they are not in the 1924/25 edition.

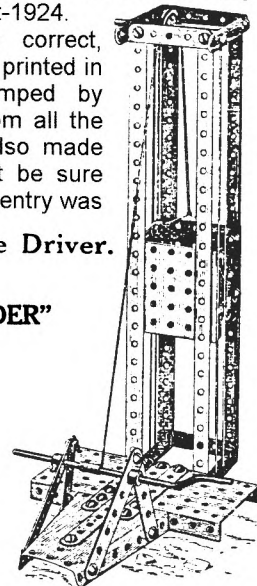
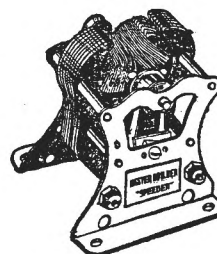
Another point of possible significance is that while the acorn logo is used in all the manuals mentioned in OSN 16, including the MCS one, it is not used in the one summarised above. In fact the only difference in presentation between the latter two is that the MCS edition has acorns on either end of the elaborately decorated MASTER BUILDER name at the top of most pages, but they are missing from the equivalent headings in Kendrick's.

So as a working hypothesis, Acorn started making and selling M B in 1915 (the date suggested elsewhere) or thereabouts, using the Broadway address as an interface. Groppers became involved around 1917 or 1918 while they were still at Bush Terminal, no doubt in control, hence no acorns, but not necessarily making the parts. The common address from 1919 or 1920 points to a probable close connection but M B may or may not have continued until they both seem to have disappeared post-1924.

If all that turns out to be correct, Kendrick's manual might have been printed in say 1916/17, and then over stamped by Groppers in 1917/18. But aside from all the other uncertainties Kendrick has also made the very valid point that one can't be sure when the information for a directory entry was actually gathered.

**No. 51. Pile Driver.**

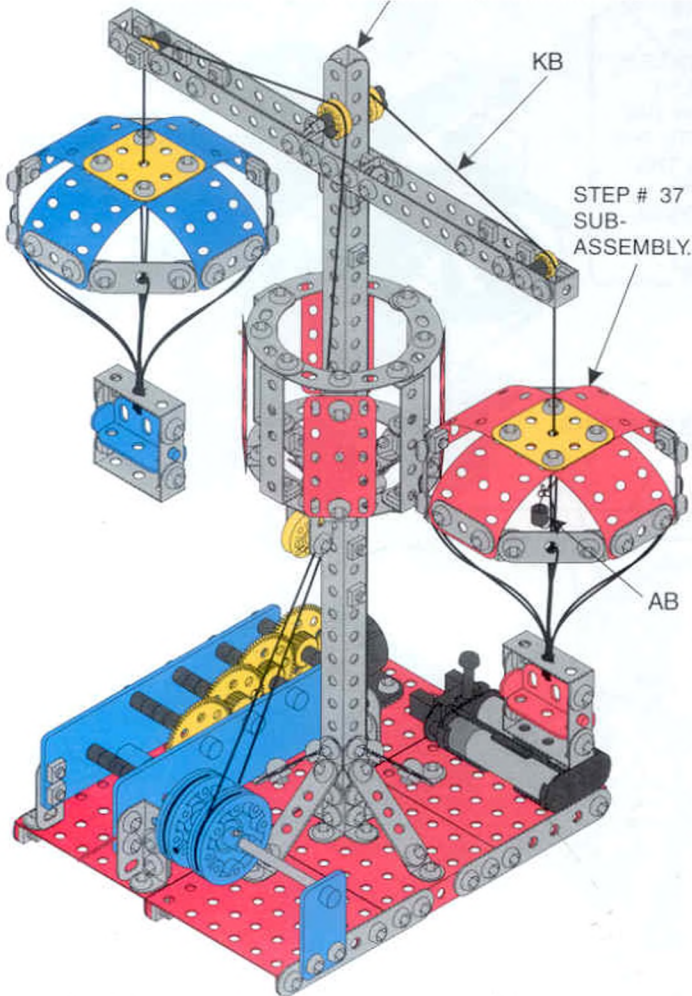
**THE "MASTER BUILDER" SPEEDER**



**The STEEL TEC PARACHUTE RIDE** A small picture of the #401 Parachute Ride was shown in 12/322, although its name in the ad from which the illustration was taken was 'Parachute Drop'. The set has been withdrawn from the U.S. market and Keith Cameron bought one in a clearance sale in Georgia last year. This description is based on some notes from him, and the box & manual that he kindly sent over.

The 20\*14\*2" box is the usual black, but with the lid nearly covered by 2 similar photos of the model, but one with a man & boy in it. On the lid: AMUSEMENT PARK PARACHUTE RIDE, 695 PARTS, & Item #7096; & on the bottom, ©1993 Remco Toys.

The manual too is in the usual STEEL TEC style with the model on the front & 401 at top right. The name, etc are as on the box, except the © 1994 REMCO, & 05/12/94 (on the back cover). The 20 pages, including covers, show 39 assembly steps, all quite clear with the help of the some text 'spoken' by the Remco Boy.



The 3\*5h Plastic Plates in the parachutes are translucent, red for one and blue for the other. The similar Plates around the middle of the pillar are red, but opaque. The Seats in the frames under the parachutes are red and blue with integral spigots at the ends.

Other points. All Strips, A/Gs, & Brackets are BZP; the Flanged Plates are red; and the 3\*3h Plates in the parachutes are yellow. In all it looks a colourful model. The Winding Pulley is blue & 2" Ø: the holes in the face are at ¾" radius. In case it's not clear it has a tapped boss. 4 such Pulleys are included in the #402 Ferris Wheel Set, but no other details of that outfit are to hand.

**The STEEL TEC 1:18 Scale 1957 CORVETTE** Entirely new to me, Keith bought this outfit along with the Parachute Ride, and again sent notes on it, the manual and the box.

Said box is 14½" square by 2" deep, partly black, partly mottled blue, but largely covered with photos of the model. As well as the name on the lid is '230 Parts', and 2 'badges' - 'plus Die Cast Metal' & 'Limited Collectors Edition'. On the bottom: Item #7120, & ©1994 Remco Toys. The letters in the STEEL TEC name are not the usual 2-D, but shadowed & without the normal horizontal lines.

The 16 page manual (including covers) is generally of the usual appearance but the STEEL TEC lettering is as on the lid, it has both the badges on the front, and the back is lined like graph paper, with WORK SHEET at the top, and © 1995, 06/30/95 at the bottom. The 14 assembly steps, with the Remco Boy again, take up 10 of the 16 pages. An additional 4 page Helpful Hints Manual with the date 5/11/94 on the back was packed in the Set.

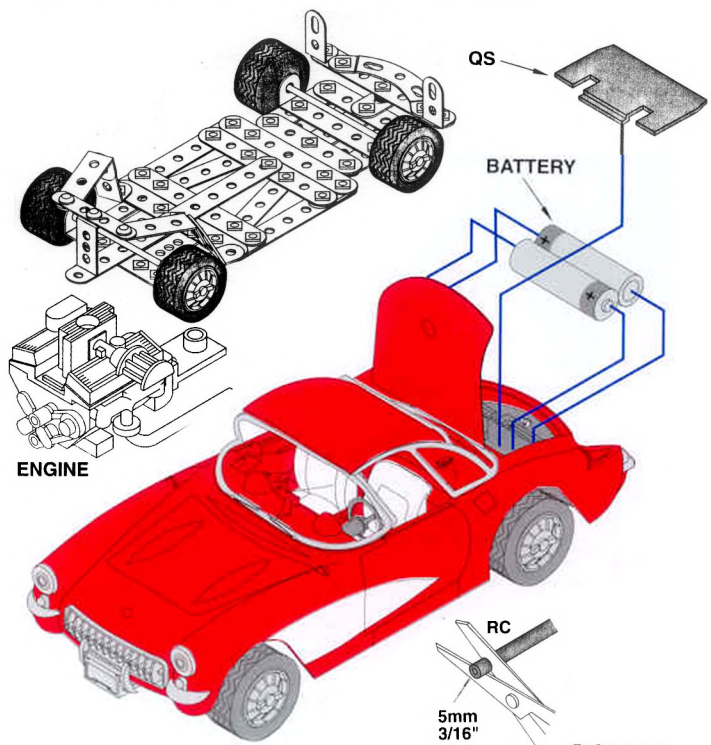
The model has a simple chassis (below) made of Strips and Brackets, including 2 Strips with slotted end holes: an 11h, and a 5h NS. The Tyres are softish rubber. The body is assembled from the grey undertray, built-up engine, white seats, outer panels, windscreen, trim, etc. The main body panels are metal castings, nicely made and painted red with a white flash on each side. The pictures on the box seem to show the wipers as separate parts but they are actually slightly raised indications on the windscreen moulding, as shown in the illustration below. The doors have white plastic inner linings. Most of the parts push into one another but a few N&B and Self-tappers are used. The removable hardtop simply rests on the top edge of the windscreen. When complete the body is bolted to the chassis, some stickers added, including Californian plates, and the finished car can be mounted on a 2-piece Stand which also serves to house the Tools. The doors, bonnet/hood, and boot/trunk lid all open, and the headlights work from 2xAA batteries housed in the boot. I can't see an on/off switch for them. The lights have to be wired to the battery holder (which is part of the undertray) and some joints are made by twisting the bare ends of 2 wires together and pushing them into a 5mm length of Tube. This is shown being cut from a long Tube, RC, and similar cut lengths are used in the model as spacers.

Keith wrote that he found the instructions confusing in places, particularly those for the chassis, and fitting the body to it (Step 12). He thought that though the less experienced might have some difficulties, when finished it's a very nice model - though 'you might not think so from the illustrations in the manual'.

Most features of the model can be seen in the general view above, including several parts new to me. The base is made from 6 of the 2½\*3" Flanged Plates mentioned in 17/481, but not noted there is that, although shown with round holes in both flanges, those in one are actually slotted. The model is 17½" high and the centre pillar is 2 pairs of 17h A/Gs (with all round holes, as in OSN 17), joined lengthways by 2h A/Gs, and across by ¾" Bolts with Spacers inside.

The gearbox Sideplates are blue plastic and along the top of each, on the outer faces, are 4 bosses with blind holes for the Axles on which the Gears run. (On the box lid these bosses are shown yellow.) All the Gears are the usual yellow plastic, and a Worm on the Motor drives the first of 3 combined 1½" Gear/Pinion. This part is shown with 64/25 teeth in the Illustrated Parts but actually has the expected 57/19. However they mesh properly at 1" centres, unlike the early Gear & Pinion, see 10/240. The last Gear/Pinion meshes with a 1½" Gear that has a brass centre but no boss, and a ½" Pinion on the winding drum shaft engages it. The near Bearing Plate for this Axle is again blue plastic (shown on the lid as clear) with a blind hole in boss at the top.

Thus the 2 plastic Winding Pulleys are both driven in the same direction and the Cords to the parachutes are wound round them in opposite directions, so that one parachute rises slowly while the other descends. Reversing is achieved by using the switch on the Battery Holder. Keith suggested altering the cording to make both rise together, and then fall under gravity by disengaging the drive.



**CONDOR** Roger Baker has kindly sent me a photo of 2 unused sets, a No.1 and a No.2, from this Italian system. Both are in green boxes, and in each the main parts are attached to a yellow backing board by brass bifurcated clips, with the small ones are in a red box with CONDOR on the lid. The label on the lids is in full colour and is the same as the manual cover shown opposite (and the one in MCS).



of models for Set 1 but only 2 for Set 2. The Merry-go-Round is one of the latter. Unlike Roger's it doesn't have a number in the circle on the cover and it was originally sent to someone who had enquired about the price of parts - they've been added in ink. The models are typical of the early postwar period & all the Flexible Plates have round holes - perhaps as they were when the system first appeared.

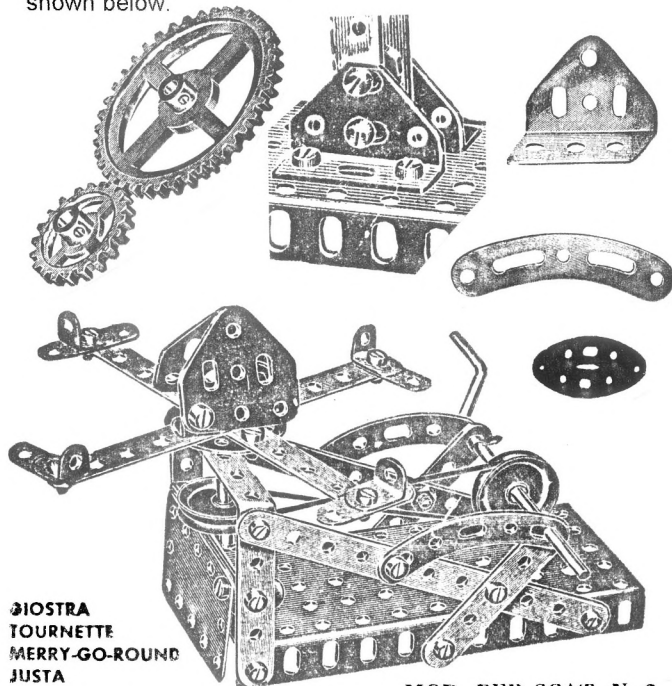
The only known history of CONDOR is that it was available in 1966 & 1969, & that the manufacturer was Condor S.N.C., via Cortina d'Ampezzo 12, 20139 Milano.

With a number of exceptions the parts look like MECCANO, and have the same size holes at 1/2" pitch. Most also look like those in MCS, but there are a few differences:

- The 5\*11h Flanged Plate has flanges on all sides (with vertically elongated holes in them as in MCS, & the model below).
- The holes in the Flexible Plates in the sets (5\*3h with no centre hole) are all slotted (like MÄRKLIN), and not round.
- The Curved Strips in the model below have elongated centre and outer holes but the one in the MCS Parts List (below, right) has longer slots between the round centre and outer holes. The pair below are those in the No.2 Set and have a slotted centre hole, but the shape of the outer ones can't be seen.
- The 28mm Loose Pulley doesn't have the 4 holes in its face that are shown in MCS and is made of plastic.
- The Trunnions with their 2 vertical slotted holes look just as in MCS and the Trunnion Sheet, but a different pattern can be seen in one of the manual models. Both are shown below.

**SUMMARY OF MANUAL** •Name: CONDOR Costruzioni Meccaniche. •No details of maker/dates/ref nos. •Page size: 243\*170mm deep. •No. of pages: 12+covers. •Languages: Italian/French/English/Spanish. •Printing: cover in full colour; inside brown on white with line drawings of parts/models. •Page Nos. of Illustrated Parts List & highest PN: 4-7, 69. •No Set Contents. •Sets covered: 1,2. •No. of models for each set: 13 (+10 Letters/Numbers), 2. •Name, Page No. of first/last model of each set [no Model Nos.]: 1: TELEGRAPHIC KEY,9 (after Letters/Numbers on p8); GANGWAY,11. 2: MERRY-GO-ROUND,12; WINDMILL, 12. •Other notes: the names of the parts on pp4-7 are in Italian only.

**Postscript, a No.7 Outfit** After writing the above a photo arrived from Don Redmond showing a No.7 which belongs to Bernard Champoux. The box scales at about 15 1/2\*13", and has a tray which fits inside. Both are made from a wooden frame forming 3 compartments, with bottoms that look like hardboard. The lid is open so its top face can't be seen; the manual cover is as shown above but with a '7' in the circle.



The parts that can be seen show the following points of interest:

- Nickel Strips & A/Gs.
- A 25h Braced Girder with no centre diamond cutouts, apparently identical to Mystery Part 17 in 7/156, except that it is a lighter red.
- A dark green Propeller (#37) of some 4" Ø.
- MECCANO-pattern 1" & 3" Fast Pulleys, but the 2" have holes, about 3/8" Ø, instead of triangular openings. All are red.
- The 1" & 3" are fitted with white Tyres, the small ones with a radial tread and the 3" with the circumferential pattern shown in MCS.
- The Large-tooth Gears, cast from white metal, with 20 and possibly 39 teeth (some can't be seen). Their diameters are probably about 1 1/3" & 2 2/3".
- A 1 1/2" Gear with no holes in its face.
- A dark blue Bush Wheel as in Roger's sets.
- A nickel Screwdriver.
- The Flanged Wheel #34 is about 3/4" Ø and looks like turned brass.
- Some bosses appear to be double-tapped but the Bush Wheels in the Sets 1 & 2 are single-tapped, All except those of the Large-tooth Gears, look brass.

▶IOSTRA  
TOURNETTE  
MERRY-GO-ROUND  
JUSTA

MOD. PER SCAT. N. 2

In passing it may be of interest to note the other unusual parts:

- The Flanged Sector Plate is 7h long with 3 rows of holes, but in the models in MCS it has 1 row of 8 holes.
- The 3\*1\*3 Double Bracket.
- BRAL-style Braced Girders, and 2h deep Fork Piece.
- MÄRKLIN-type Coupling (see 5/106, Query 9), and Flat Cross Bracket (#114a/11760) but with the 2 outer holes elongated.
- The Large-tooth Gears above, which are also shown running at right angles in one model.
- The Bush Wheel is about 1 1/2" Ø.

MCS gives the colours as nickel, red & black, and on the front of the manual most of the Plates are red, with a few, and all the Strips, light blue. (And some of the parts don't match the design of the actual ones) The Flanged and Flexible Plates in the sets are red, as are the 28mm Pulleys; the Trunnions are green; the Bush Wheel and Curved Strips dark blue; and all the other Strips are nickel plated. The Spanner, Screwdriver, and Crane Hook are black.

Below details of my own manual, which has a number

**Another CONSTRUCTION Manual** Thomas Keel kindly sent a copy of a manual similar to the one at the bottom of 17/489, but a little later. At first I thought it was earlier because although the Universal is shown in the Parts List & Set Contents, the Basic Construction showing its use isn't included. However the motif in the gearwheel on the cover is the bird of VEB Ppaffschwende and not the 'S' of VEB (K) Schmerbach. The maker is given on the back cover as VEB Spielwaren-Mechanik 5631, Ppaffschwende, and the PR is ?39 - 244 - R 123/79. The 79 might indicate 1979, and this may be the last manual before the new series of sets (C01 upwards) was launched. Some notes on possible dates were given in 17/490.



The manual has only 48 pages including covers. It contains all the models in the 'S' but some are not in the same order, and some of the auxiliary views are omitted. The Basic Constructions too are in a different order and only go up to G15.

## Another 'New' KONSTRUKTOR

This one will be KONSTRUKTOR [10] in my Database and it comes thanks to Chris Freeman, who sent a photo of his No.2 Set and lent me the manual. A number of Russian sets seem to be based on other systems, and this one looks as if it was inspired by KONSTRUCTION, the early version as shown in MCS (& see 8/181), the one with the larger Pulleys apparently turned from the solid. As would be expected the holes are about 4mm Ø at 10mm pitch. A No.1 and a No.3 set are also covered in the Manual. There's nothing to positively date the set but Chris suggests the 1950s.

**The Parts** The 58 parts shown in the manual include most of the KONSTRUCTION (KNN) parts in MCS, although a few have slightly different dimensions. However there are no A/Gs, no Gears except the Bevel, and neither of the 2 parts (pressed Pulleys) with tapped bosses. Also all Rods are threaded over their whole length; and there's only one pressed Pulley, and one Tyre (or fat Rubber Ring) for it.

A few parts are peculiar to KNR: a wide Double Bracket which was one of the later KNN parts, a long, thin Tube of some sort (#3), which doesn't seem to be used in any of the models; a 15mm Ø Washer as well as the KNN 10 & 20mm ones; and an 8 & 12mm Ø Spacer as well as the 10mm KNN part. There seems no compelling reason for the extra Spacers & Washer.

Some details of the parts follow, based on the illustrations in the Manual and the photo of the Set. Many of them can be seen in the models below, but the Spanners, Tube, & Bevel from the manual are shown separately, together with the 'turned' Pulleys from the photo. With the one or two exceptions noted I could, as far as I can tell, be describing KNN parts.



- Strips with 2,3,4,5,6,7,9,11,15,25 holes, and perhaps unlike KNN, large radius ends cut quite close to the end holes.
- Wider than usual Double Bracket, 1\*3\*1, & 1\*5\*1h DAS.
- Reversed Angle Bracket and Double Bent Strip which span 5 & 3 holes respectively, and have no hole in their 'vertical' middle parts.



- A normal Angle Bracket & one with 2 slots. One 2\*1h with the single hole slotted. A 2\*1\*2h Double Bracket.
- Wider than usual 5\*5 & 5\*11h Flanged Plates with long slots in their deep flanges. 2\*2, 3\*3, 3\*7, & 5\*9h Perforated Plates. All the Plates have unrounded corners.
- 10,15,20mm Washers. A 34mm 4-hole

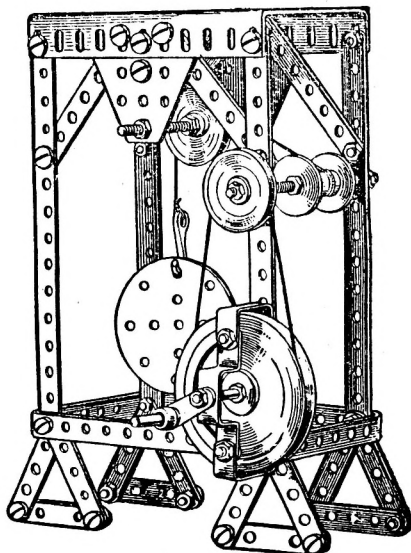
Wheel Disc (not the KNN 30mm). A 50mm Circular Plate with circles of 4 & 8 holes, and one 70mm diameter with 3 circles of 8 holes each. Flat Sector Plates with 5/3\*7h, 3/1\*5h, & 3/1\*3h.

- A Pulley of about 26mm Ø with a fat Tyre or Ring to fit it. What look like turned Pulleys of 16,25,30,35 & 60mm Ø; some of the sizes are different to the KNN ones, but like those none have any holes in their faces.
- Threaded Rods 30,50,95 & 120mm long, again not all the KNN sizes. Spacers of 8,10, & 12mm Ø, perhaps about 10-12mm long. The slender Tube #3, of unknown dimensions.
- A Crank Handle, a Flat Hook, and a Bevel Gear (perhaps not as the KNN pattern). None is listed but there's some black Cord in the Set.
- Bolts 9,11, & 18mm long, shown with fillister heads. Hex Nuts. A wooden handled Screwdriver which scales at 95mm long, and the 2 Spanners, about 75mm long. (The KNN ones look similar but both have angled ends)

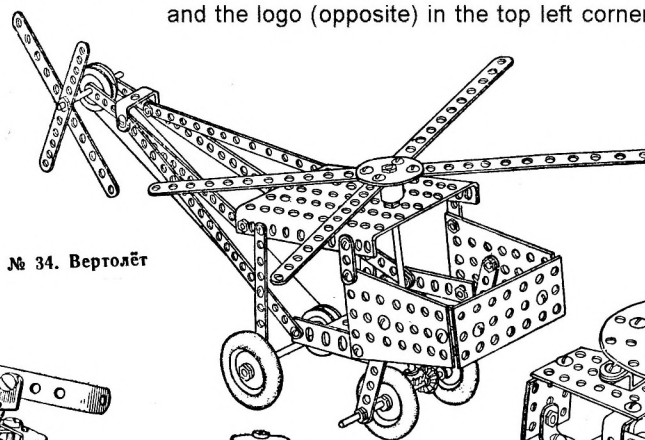
Apart from black Spanners and dark Threaded Rods, the parts in the Set are bright looking: perhaps the Strips, Plates, etc. are BZP, and the Spacers and turned Pulleys, aluminium.

Another link between KNR & KNN are the PNs. In KNN all the same parts of one type are usually under one number, followed by a different letter for each. So for example the Pulleys run from 6 to 6e. The KNR PNs general follow this pattern, although in some cases the equivalent Cyrillic letter is used, while in others the Russian letter that looks most like the German one has been chosen.

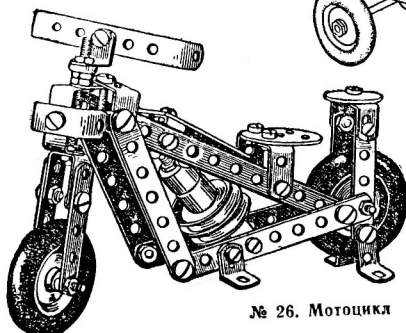
**The Set** The box scales at 20\*30cm and is divided into 10 compartments by card trays. The lid, at the top of the page, is black and yellow with the model Loco black on white. The word above the name means 'metal' and the logo (opposite) in the top left corner



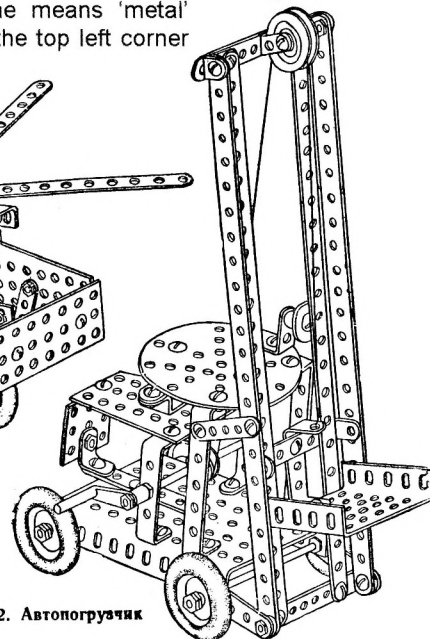
№ 10. Подъемный блок



№ 34. Вертолёт



№ 26. Мотоцикл



№ 32. Автопугачик

has a word under the bird (wild goose?), but I can't work out what it is. The Loco is in the style of the one on the CONSTRUCTION cover shown in 17/489.

No Set Contents are given in the Manual. The main parts that can be seen in the photo of the No.2 are Strips of all lengths; 2 of each DAS; one each of the Flanged Plates, the two larger Perforated Plates, the 50mm Circular Plate, and one or more of the Sector Plates; 1 of the 60mm turned Pulleys and 2 of the 30mm; and 4 Pulleys with Tyres. The ends of what may be a Curved Strip can also be seen, its centre is hidden under other parts. No such piece is in the manual (or in KNN) - it has outer holes about 75mm apart and no holes next to them.

Judging from the parts used in the models for the different sets, the No.1 has most of those parts too, but it doesn't have the Sector Plates needed in the models from the larger sets. The main additions in the No.3 are 1 or 2 of the 70mm Round Plates and a pair of Bevels. The maximum number of Nuts needed for the No.1, 2, & 3 models are 53, 57, & 70, about the quantity in the 3 basic KNN sets. The latter are not entirely progressive and this may also be the case for the KNR outfits, although the models do get appreciably larger from the No.1 through the No.3.

**The Manual** Details are given below. The cover has the same logo as the box lid, and the words over the name mean 'technical toy'. Each model has a page to itself, with

one line drawing and a Parts List. Those shown here are fairly typical, with some quite neat and some a little clumsy. All are quite straightforward and a few are familiar from the early CONSTRUCTION manual. Cord drives are used in a fair number but the Bevels only in the Helicopter, to drive the main rotor from the landing wheels. I doubt if the models do justice to the number of parts in the sets.

**SUMMARY OF MANUAL** •Name: KONSTRUKTOR •Details of maker: none. •Dates &/or Ref Nos: PR includes 100864 & 3047. •Page size: 207\*173mm deep. •No. of pages: 52 inc covers, unnumbered. •Language: Russian. •Printing: Cover brown & green on fawn; inside blue on white with line drgs of models. •Page Nos. of Illustrated Parts List & highest PN: 5-6,11B •No Set Contents. •Sets covered: 1,2,3.



•No. of models for each set: 20,13,8. •Name, Model No., Page No. of first/last model of each set: 1: Drilling Machine, 1,7; Road Sign,41,47. 2: Factory Truck,8,14; 3-Wheel Delivery Cart, 37,43. 3: Mobile Crane, 7,13; Helicopter,34,40. •Other notes: The models for each set are given on p3. The model names are what they look like to me.

**KONSTRUKTOR-MEKHANIKA** That's the name on the lid (below) of a Russian set that Richard Symonds has found, and which contains all the types of part listed as Mystery Parts No.30 in 15/403. He kindly sent across photos, some sample parts, and copies of all that remains of the manual, fortunately including an illustrated Set Contents. A few details of another set with this name were given in 16/445 but as far as I can tell they are not related. The 'No.3' on the box lid may mean there are several sets in a series with similar parts, but no others are mentioned in the manual pages. The only other possible connection I've found with other Russian sets is that the intro to the K-M Set Contents is over the name I. Sakharov, and an I. S. Sakharov is by the model on p1 of MCS entry for KONSTRUKTOR-SHKOL'NIK (ex WKONbHMK). Most of the parts for that set look very similar to K-M ones, and the A/Gs are stated to be black, but on the other hand I'm told that Sakharov is a fairly common Russian name. There's no indication of when K-M sets were made.



**The PARTS DATA** (in mm) **STRIP** (5-hole): •hole pitch/dia, 10.0/4.1; •width, 10.1; thickness, .75; •end fully radiused. **BOSS**: no data except double-tapped, probably M4. **THREAD**: M4. **AXLE DIA**: 4.00. **DP (Mod)**: N/A. **NUT**: hex 7.1 A/F; **BOLT**: roundhead 6.1 Ø; both dull plated steel.

Most of the parts are as OSN 15; the others are described below, with illustrations where appropriate.

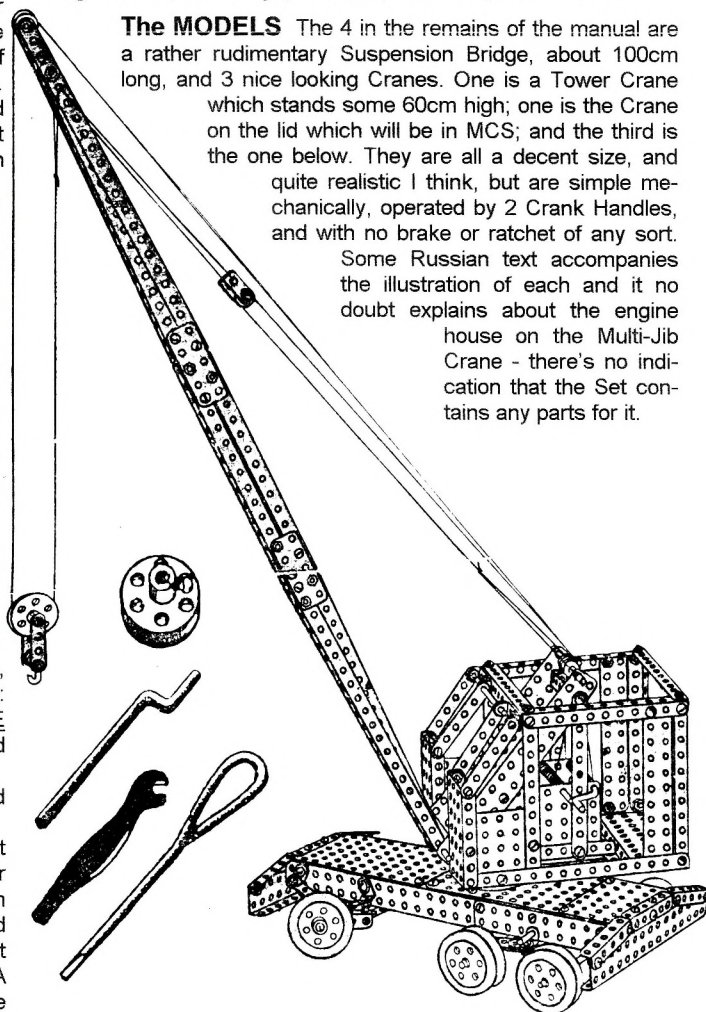
• A **Pulley**, 29mm Ø by 3mm wide with 6 holes in the face, a light dull plated colour including the boss. A fat black **Rubber Ring** for it. • 27,42,51,90,114,150mm **Axles**, & a **Crank Handle** 108mm o/a. Both with a bright finish. (Scaled lengths) • A brass coloured **Collar**, and a **Spacer**. • A **Nut** 2.2mm thick. 2 **Bolts** 10 & about 18mm u/h. A **Threaded Rod**, 35mm long with a brass look. A 10mm bright **Washer**. A hank of black **Cord**. • A bright wire

**Screwdriver** about 125mm o/a. A dull plated single-ended **Spanner**, 82mm o/a, with jaws to fit the Nut. The Spanners in the Mystery Parts would also have fitted this Nut.

**The SET** The box is a greeny-blue colour and scales at about 26\*40cm. The parts sit within cardboard partitions. The top of the lid is red with the multi-jib Crane black. The Contents include 58 Strips, 8 DAS (the first size in OSN 15 should be 1\*5\*1h), 38 A/Gs, 8 Channel Girders, 10 Flanged Plates, 16 Brackets, 4 Flanged Discs, 12 Pulleys, 17 Axles, 115 Bolts, & 140 Nuts.

**The MODELS** The 4 in the remains of the manual are a rather rudimentary Suspension Bridge, about 100cm long, and 3 nice looking Cranes. One is a Tower Crane which stands some 60cm high; one is the Crane on the lid which will be in MCS; and the third is the one below. They are all a decent size, and quite realistic I think, but are simple mechanically, operated by 2 Crank Handles, and with no brake or ratchet of any sort.

Some Russian text accompanies the illustration of each and it no doubt explains about the engine house on the Multi-Jib Crane - there's no indication that the Set contains any parts for it.



**YUNOST'** David Hobson kindly lent me a No.2 Set that appears to be complete and unused. YUNOST' is the name of the Russian KONSTRUKTOR set that was originally called ЮНОСТЬ in MCS, and the dictionary says Yunost' is a noun meaning youth (as opposed to age). The 43 parts shown in MCS are those for the No.2, and they are generally like MECCANO in design, although some of them are made of aluminium. No doubt there are other parts because Sets 1-5 are mentioned in the intro to the Manual. From a slip in the Set it was packed in 1990, and MCS gives a date of 1979.



**The PARTS** The parts are generally quite well made and finished, though there's a little burr here and there, and the paint doesn't look very durable. Not all the illustrations in MCS show the parts accurately - the notes below indicate where they differ from MECCANO.

• **DATA** (in mm) **STRIP** (11-hole): •hole pitch/dia, 12.7/4.3; •width, 12.6; thickness, .70; •ends fully radiused. **BOSS**: •o/d, 10.05; •i/d, 4.17; •steel; •double tapped. **THREAD**: M4. **AXLE DIA**: 3.93. **DP (Mod)**: N/A. **NUT**: hex 7.0 A/F; **BOLT**: roundhead 6.8Ø; both grey plated steel.

• Strips are aluminium anodised a pale yellow. The Curved Strip is very like M90a but the slotted holes are not quite as long.

• The Flanged Plate is anodised pale green and its flanges are about 1mm deeper than M52.

• All the Flexible Plates have a centre hole and slotted end holes. The metal ones are painted medium green, except the 5\*3h, which is a fresh light green, and the red M199 (bent through 90°). All the plastic ones are a translucent, dull yellow colour.

• Pulleys are generally like M22, M22a, & M20a except: • the first has 27mm Ø aluminium cheeks & is nearly 5mm across the V, • the 'M22a' appears to be a light alloy casting and the 3 holes in the face just take an Axle Rod, • the discs of the 2" are held by a spot weld outside the hole in each spoke. The Bush Wheel has a 36mm Ø steel disc, and one of the 8 holes in it hasn't been stamped out. Bosses are about 7mm deep with a small chamfer at the end, and their peening is a ring of 7 to 8 mm o.d. All these parts are painted medium green including the bosses.

• The 1" Tyres are black rubber with shallow blocks of tread on the outside; off the Pulley they are 37mm o.d. There are no Rubber Rings in David's set.

• The Trunnions are also medium green and have slightly larger cutouts leaving only about 3mm of metal on the diagonal edges.

• The Flat, Angle, Double, & Reversed Angle Brackets are all nickel plated: the latter is thicker than M125, with larger bend radii.

• The Axles & Crank Handle (135mm o/a) are also nicked and have rounded ends. The '176' is dull grey, 5 turns wide, with an eye only partly formed. The '212' & '213' are nickel plated and the latter, unlike the illustration, has a 1/2" Ø disc. The Hook is painted red. The Cord is thin & black. The handle of the Screwdriver too is black; the Spanners are nickel.

• The Bolts are 7, 10 & 26mm u/h, and the last length isn't shown in the Parts List. The Nuts are 4.9mm thick and are probably the standard commercial size. The 8.2mm o.d. Washers are heavily dished. Set Screws have 5.4mm Ø tapered cheeseheads and are 5mm u/h. They and the Washers are a light brass colour.

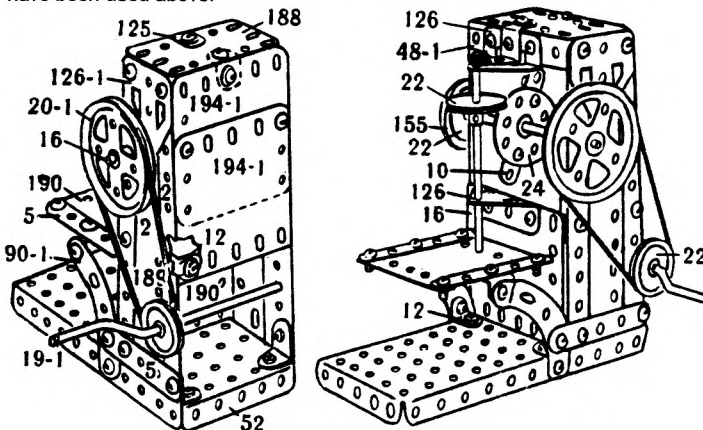
**The SET** The box is 13 3/4 \* 14 3/4 \* 1 1/4", and the coloured lid has a boy and 5 models on it, including the Helicopter that's on the manual cover in MCS. Only 2 can be made with the No.2 set and a few different parts can be seen in the other models, including M1,6a,38d,214,215,221. Certain parts aren't the same colour as those in the Outfit, with some Strips red, yellow Pulleys, and a blue Flanged Plate. All the models carry stick-on labels, but none were found in the Set. A large label inside the lid shows the parts and how many are in the Set.

The parts are housed in recesses in an expanded polystyrene block, with the N&B, and small parts, in 2 small,

clear plastic packets. It's quite a small set with, apart from 2 extra 5h Strips and a few N&B, the same content as a 1960s MECCANO No.2.

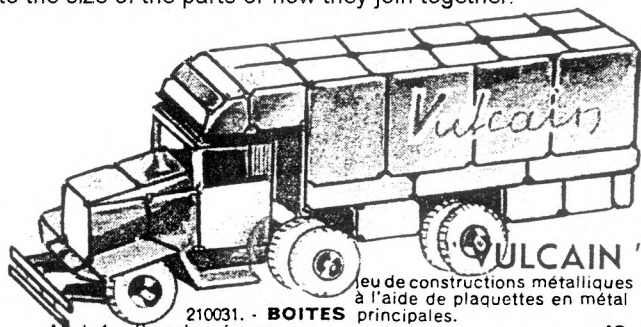
**The MANUAL** The cover is as in MCS except that the CCCP above the 'swallow' motif has gone - a sign of the times no doubt. The logo, presumably the maker's mark, is shown above, together with the name of the Set. The illustrations of the parts are as in MCS except that M22a is shown with 3 holes in its face. The models are exact copies of 1960s MECCANO with the photos replaced by line drawings, and changed to show the correct style of N&B. The first 12 models are M1.1 to 1.12, though the order is slightly different, and the final 16 are M2.1 to 2.16 in that order. The last model is as in MCS (No.28) but there's no reference at the bottom of the page. The other models on the box lid are from the 1960s MECCANO No.3 manual, except the Helicopter which is an original design, based on a Russian machine.

**SUMMARY OF MANUAL** •Name: KONSTRUKTOR YUNOST' [& 'No.2' on p1] •Details of maker: none. •Dates &/or Ref Nos: a long ref. on p40 inc 150000/1/1-50000/23/113545/129a. •Page size: 145\*197mm deep. •No. of pages: 40 + covers. •Language: Russian. •Printing: cover as in MCS with red panels & coloured model on blue ground; models are line drgs. •Page Nos. of Illustrated Parts/Set Contents & highest PN: 5-7,213. •Sets covered: No.2. •No. of models: 28. •Name, Model No., Page No. of first & last model: AKROBAT,1,8; RAZVODNOI MOST,28,36. •Other notes: pp2,37-40 are blank. Transliterated names have been used above.



№ 17. МЕХАНИЧЕСКИЙ МОЛОТ

**VULCAIN** Jeannot Buteux kindly sent a page from a 1934 catalogue and one of the metal construction sets in it, called VULCAIN, is new to me. The whole ad is shown below and the models are said to be made from metal Plates. The main set was 'A' and was available with the parts painted red or white. Then there were supplementary sets B and C, again with red and white versions. All these were sold at Fr.10 each. In addition 3 de luxe sets are listed: Nos.1, 2 & 3, at Fr.35, 70 & 100. No indication is given as to the size of the parts or how they join together.



Jeux de constructions métalliques à l'aide de plaquettes en métal principales.

210031. - BOITES principales.	
Mod. A, pièces laquées rouges.....	10.
Mod. A, pièces laquées blanches.....	10.
210065. - BOITES complémentaires.	
Mod. B, pièces laquées rouges.....	10.
Mod. B, pièces laquées blanches.....	10.
Mod. C, pièces laquées rouges.....	10.
Mod. C, pièces laquées blanches.....	10.
210109. - Boites luxe. N°1. 35. N°2. 70. N°3 100.	



**KONSTRUKTOR SHKOL'NIK** Another set from the Leningrad factory that made KONSTRUKTOR UNIVERSAL'NYI (11/285) & KONSTRUKTOR MALYUKTA (16/435), and in between them in size. On the name, the box has on it, IGRUSHKA KONSTRUKTOR "SHKOL'NIK" in Cyrillics, & in English, TOY DESIGNER "SCHOOLBOY", with underneath (SHKOLNIK). Analogous names on the manual are KONSTRUKTOR UNIVERSAL'NYI "SHKOL'NIK", & "SCHOOLBOY" DESIGNER. I've thought it best to stay with the common Russian elements even though MCS has an unrelated KONSTRUKTOR-SHKOL'NIK (hyphenated) already.

KONSTRUKTOR UNIVERSAL'NYI (as described in OSN 11) and this Set were on sale in America last year and my thanks to Keith Cameron for sending over the K S box lid, manual, & some parts, and to John Seaverns for a photo of his Set.

The box measures 23\*18½\*2½cm and the full colour lid has the same rather dreamy quality about it as the K U one; in this case with a photo of 2 of the manual models, one driven by a cat and the other by a teddy bear, and a huge fluffy animal toy in the background. It's a nice picture but I wonder about it's impact on the 9-10 year olds that the Set is said to be suitable for. (The more advanced K U set was for children of 6+, and the simpler K M for the 6-7s.)

The box has cardboard partitions and the parts are loose within them. There are 29 different types against 41 in K U, including in both cases the same 4 Tools. Nearly all were used in the K U outfit, but a 10h Strip, and the Wheel and

Tire for it are new. The Wheel (left) is made of 2 of the discs that are used in the Bush Wheel, turned so their dished centres are next to one another facing inwards, and then peened onto a boss. The boss is the standard 8mm Ø, but at 9mm it isn't as long as the K U Bush Wheel one, and its 4.2mm bore isn't quite such a sloppy fit on the Axles. 2 of the Wheels in the Set are made from 6h, and the other 2 from 8h discs. The Tires are actually soft plastic rings, 39mm o.d., and pale blue-grey in colour.

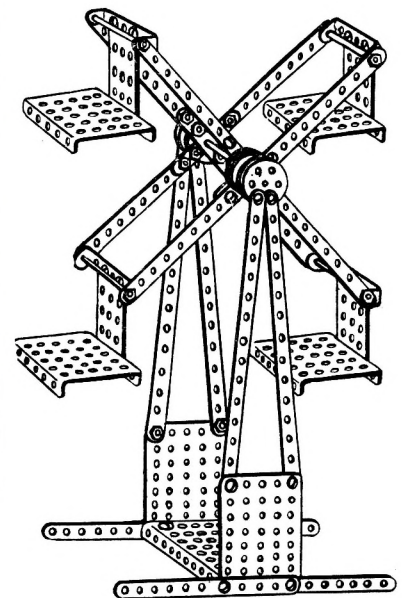
220 parts are claimed on the cover of the manual but adding up the quantities inside gives only 210, including 70/60/12 NBW. K U has the same number of NBW but an extra 88 other parts. The main ones that aren't in this set are 7 & 11h Strips, 7h long DAS, Curved Strips, A/Gs, 2\*5h Plastic Plates, Trunnions, Plastic Wheels, and the formed plastic parts. One part in both Sets worth noting is a 70mm Rod with Threaded Ends - its smooth centre portion is 3.5mm Ø.

The manual has 20 pages somewhat smaller than A4, and the style of its cover is rather like the K M one. Inside many of the illustrations of the parts are similar those used for K U, though the PNs aren't the same. The sketches showing how to use the Tools and N&B, are more like K M, though with English text as well of course. The presentation of the 14 models differs from both, with a clear line drawing and list of parts as before, but with additional sketches to explain the construction, and some explanatory text. The only models that don't have these extras are the last two on the inside back cover (the ones shown on the box lid), and perhaps they were an afterthought because only 12 models are mentioned in the Introduction. No.14 is shown above.

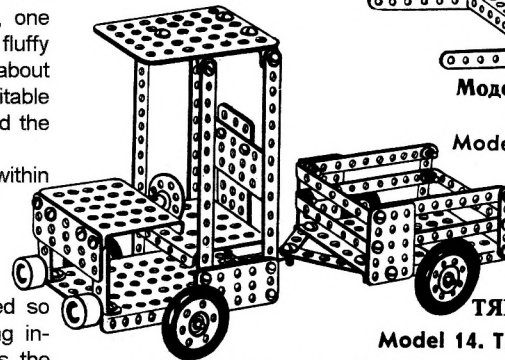
The first model is a very simple Ladder and the largest is the Giant Wheel top right. The others include several simple fair-ground models and several vehicles, but although they are fair of their type, none have quite the charm of some of the K U ones. [It all depends though - Keith describes them as of 'odd appearance', and the K U Automobile as 'amazing, and looks like a caricature of something out of a 1920s comedy, but makes clever use of those red plastic parts for mudguards'.] A few of the names of the models are a little odd but not so unusual as some of those used for the parts, with a Flanged Plate called a Slab and a DAS a Clamp. In both cases they are the dictionary translations of the Russian words used, with no more apt alternatives offered in my dictionary.

The PR on the back cover includes 908 and the date 22.10.91; the latter is of similar form to the K U 29.09.91, but comparing 908 with the K U 693 makes is unlikely that either indicates a date.

**MANUAL SUMMARY** •Name: KONSTRUKTOR UNIVERSAL'NYI "SHKOL'NIK" | "SCHOOLBOY" (SHKOLNIK) DESIGNER. •Details of maker: none. •Dates &/or Ref Nos: LFOP2.3ak.908. Tir.50000 zlkz.22.10.91. on back cover. •Page size: 187\*245mm deep. •No. of



**Модель № 12. КОЛЕСО ОБОЗРЕНИЯ**  
Model 12. GIANT WHEEL



**Модель № 14**  
**ТЯГАЧ С ПРИЦЕПОМ**  
Model 14. TRUCK WITH TRAILER

pages: 20 inc covers. •Language: Russian, English. •Printing: line drgs of models; cover (above) B&W with some red. •Page Nos. of Parts List/Set Contents & highest PN: 4-5,29. •Sets covered: 1 (no Set No.). •No. of models: 14. •Name, Model No., Page No. of first & last model: LADDER,1,7; TRUCK WITH TRAILER,14,19. •Other notes: none.

**The METALLIRAKENUSSARJA 240 Set** The number 200 outfit of this Finnish system, made in Estonia, was described in 11/281. Sets were still on sale last year and Ivor Ellard kindly brought this one back for me. Just as the 200 was comparable to the SKOLENS 2 (MKS2) Set (see 17/483), so this one is the equivalent of the SKOLENS 3, also described in OSN 17.

The 240 is in a normal lidded box 43\*28½\*3½cm, white but with the lid completely covered by a label which, apart from the set number, is an enlargement of the one on the 200 sleeve shown in OSN 11. Inside the parts are strung into the recesses of a substantial, white, moulded plastic tray, which looks just like the MKS3 one on the right of page X1.4d in MCS.

The set contents too are exactly as for MKS3 in MCS (pp X1.3b/4b/6a & 3c/4c/6b), apart from a few extra N&B and an extra 5\*5h Flexible Plate. With minor exceptions the parts are identical to those in the 200 and the MKS3 - notes on the differences and other comments on the parts follow.

- The Curved Strips and all the Brackets except the Reversed Angle Bracket, are stamped from the thin metal with the brown finish. This, as Ivor suggested, was probably a simulated wood finish intended for some other product.
- The 10½\*7½cm plastic box for the small parts looks just like the illustration in MCS with 2 lines moulded into the lid - it's orange and the one in the MKS3 set is turquoise.
- Axles and N&B are packed in separate small clear plastic packets which are PN 53 in MKS3. Two other parts which may not be obvious in MCS are Nos.10 & 106 - in the 240 they are a 70mm Threaded Rod and 1m of cream Elastic Cord, about .6mm Ø. Also, the Flexible Plates, Nos.66,71 & 85, are 5\*5H, 3\*11h, & 3\*5h respectively, and all have a centre hole.
- The 75mm Pulley is dark green instead of the light blue seen previously. The plastic Axle Clips are orange, yellow, & translucent. The Worm Wheel too is translucent instead of white. The Cord is thin, light brown twine. The Crank Handle is 13cm o/a with a 2cm handle and 9¼cm shaft.

There's no manual, only the single-sided A4 Model Sheet that was also in the 200. Two of the models were shown in 11/281 & 17/483.

**SONNEBERGER** This is the East German system that had about 50 aluminium parts with holes at 10mm pitch, most of 4mm Ø, but some 5½mm. It was made from soon after WW2 until at least the 1970s, by 3, or probably 4, different firms. Over the years many of the parts seem to have remained the same but there were some variations, and the manuals and boxes were changed several times.

The original entry in MCS was under VEB INJECTA, the name of one of the makers. This may have been because some manuals have that name on the cover and not SONNEBERGER, although the cover shown in MCS does have both. A later /FB section is called SONNEBERGER, and that cover is one of those with only VEB INJECTA on it. Incidentally Sonneberg is the name of a town about 80km south of Erfurt. Both MCS entries show most of the parts, and the set contents of the main sets (Piccolo, Standard, & Spezial), but only the /FB has details of the small accessory Zwerg I & II outfits. EZ has information on the makers and the colour of the parts (see 15/418), and also has colour photos of several sets.

These notes are based on all the sources above plus a Piccolo set that David Hobson lent me; photos of, and some parts from, a Spezial outfit owned by Richard Symonds; a 'Goods Train' box that Harry Marien sent across; and 2 manuals of my own. A thank you to all contributors. I shall consider in turn the phase associated with each manufacturer, in what I hope is chronological order.

**SCHOENFELD & BOETSCH** This was the original firm at Sonneberg and EZ gives the start date as 1948. 1945 is mentioned in the Introduction shown in MCS/FB, p6, but it needs confirming that this date does refer to the start of SONNEBERGER (SON henceforth).

No firm information is available on this period but it's possible that the Piccolo set, in the red box with gold lettering, in EZ Plate 65, is from this time: as would be expected it has the original type of 30mm Ø Pulleys (Nabenrad) with 8 holes in the face, against 4 later (cf MCS/NZ & /FB). Another part shown, which may not be clear in MCS, is the Half Pulley (Scheibenrad, klein). In early illustrations it scales at about 26mm Ø and looks almost like a flanged disc but later it's nearer 20mm and more 'V' pulley shaped. To form a pulley a pair are locked with Nuts on a Screwed Rod - threaded as well as smooth Rods are used as axles. The EZ set also includes a normal Pulley of about the same size with a boss, but I've not found any other evidence of such a part. One piece not shown very clearly in MCS is the Lochscheibenrad, geköpft: the plain Lochscheibenrad is a flat 50mm Perforated Disc and the geköpft version is flanged, as can be seen in the Tractor shown later.

**VEB (K) METALLWARENFABRIK SONNEBERG** This manufacturer not mentioned in EZ, but the name can be seen on the fawn/blue manual shown in EZ, it is on one of mine, and also on the Goods Train box. It is always associated with the triangular logo below, which has the name in tiny letters around the lower sides. What does MESO stand for? From the artwork it seems likely that this firm followed S&B, and preceded VEB Injecta Steinbach. Perhaps VEB Sonneberg was the name for S&B after it had been nationalised.

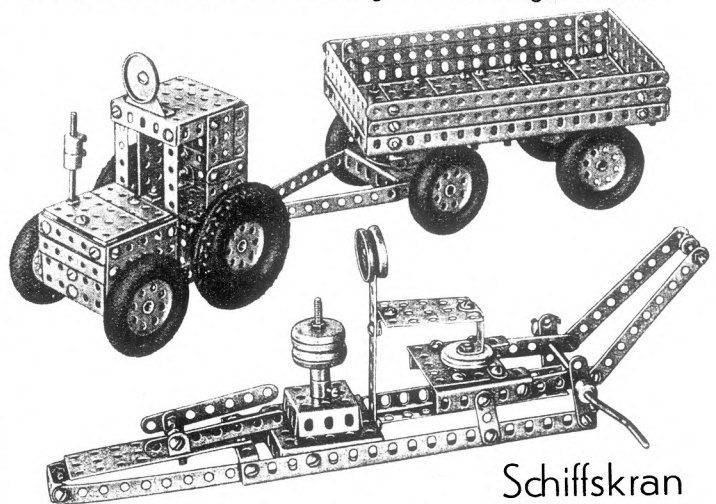
Starting with the Güterzug box. It's red (27\*18\*2cm) with a large cream label on top bearing a photo of the Goods Train (below), with Güterzug under it, the logo, and the SON and VEB names in small letters, all in dark blue. Per-

haps it was a theme set with parts to make the Loco and 3 Trucks, though if so the box must have been packed with parts. (It was full of parts but though they were aluminium, none of them were like SON.) In the illustration it may be possible to see that Half Pulleys are locked against what are probably the 30mm Pulleys to form flanged wheels, and are also used in a stack for the funnel.

My 'manual' of this period consists of 24 loose sheets inside a folder, 210\*157mm deep. The sheets look like the ones shown in EZ but the cover of the folder is in full colour with 2 boys working on a blue Glider, against a pink ground. It's the one in MCS/NZ apart from having the different name and the MESO logo. All the sheets have the reference v/5/24 Si577/54, and possibly the last 54 is the year. The first sheet has an Intro and Set Contents quite similar to MCS/FB, p6. The Zwerg (literally 'dwarf') accessory sets have already been mentioned: #I contained about 50 Strips & Brackets, plus some Axles, N&B, 2x30mm Pulleys with Tyres, and a Spanner & Screwdriver; the #II included 4 of the Pulleys/Tyres, Axles, and 2 large & 4 small Gears.

The others Sheets have on one side a photo of a model, or more than one on a few sheets, and on the other some notes on the prototype, and the parts needed, excluding the N&B. No indication is given as to which models can be made with which set, but they range from simple Gardening Tools (Ackergeräte) to quite large Cranes of the size of the Digger in MCS/FB. A fair range (there are 35 Bolts in the Piccolo & 200 in the largest set) but simple mechanically, & the Gears in the Spezial aren't used. Some of the models must be intended for that outfit though since the Digger for example, needs more parts than are in the Set. It's difficult to follow the detail of the larger models from the photos.

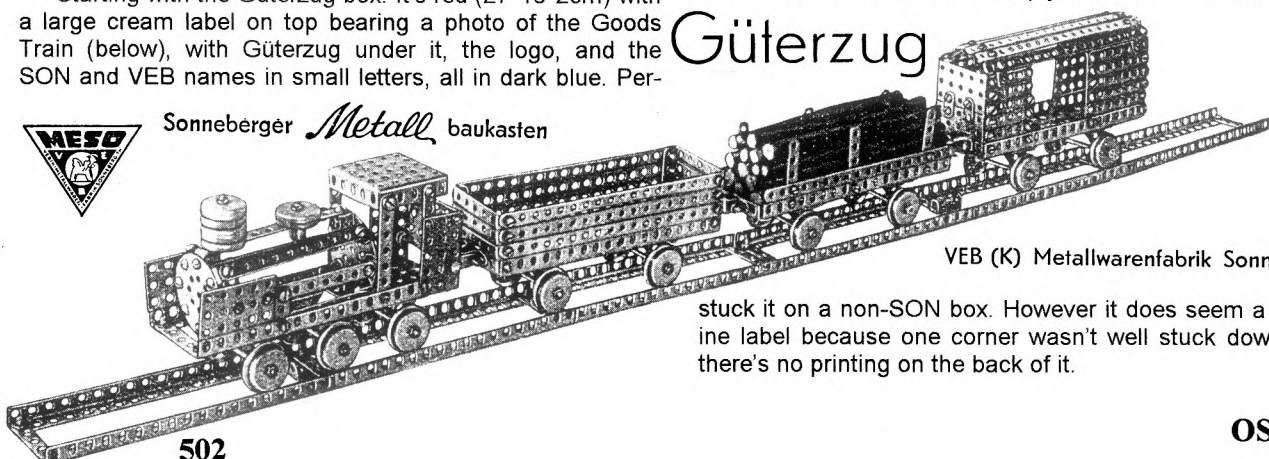
I've chosen to include the models below because they show some points of interest about the parts. The large Tyres are in the Parts Required but not in the Set Contents, and they aren't shown in MCS. The small Tyre looks much fatter than the ones in later sets & manuals. No oversize holes can be seen but there are elongated holes in both arms of the A/Gs, and in the flanges of the Flanged Plates.



Schiffskran

The format, size, and colour of the model side of these Sheets is identical to the label on the Good Train box and I did wonder if someone had simply taken a Model Sheet and

## Güterzug



VEB (K) Metallwarenfabrik Sonneberg / Thür.

stuck it on a non-SON box. However it does seem a genuine label because one corner wasn't well stuck down and there's no printing on the back of it.



Sonneberger Metall baukasten

**VEB INJECTA STEINACH** Steinach is a town just up the road from Sonneberg, and production is said to have started there in 1955. MCS/NZ and pp5-7 of /FB probably show an early phase of the Injecta period with the 2 boy/Glider design on the manual covers and box lids. The Steinach logo (below) can be seen on some of the pages, but the earlier slogan is still used: Das praktische Lehrspielzeug, literally, 'The practical (or clever, or handy) teaching toy'. The reference that can be read is v/5/24 Si989/56. The 8-hole Pulley is still shown, but it's not possible to say whether the elongated holes have been changed to the extra large round ones. The Trunnion (with cut-in sides, below) may be a new part because this is the first mention of it. Apart from the addition of some Trunnions, the contents of the main sets and Zwerg II are unchanged, but Zwerg I has slightly fewer parts. What appears to be a Zwerg II is shown in EZ and a length of brass Chain can be seen in the box, but I've not found mention of Chain anywhere.



MCS/FB, pp2-4a, are from a later manual and the modified parts are shown in the Illustrated Parts - the 4-hole 30mm Pulley, the smaller Half Pulley, a revised Double Bent Strip which had spanned 3 holes but now has sloping sides and spans 5 (above), and the triangular Trunnion (above). Large holes replace slots in the AVG, and perhaps in other parts, but they can't be seen. Only the contents of the Spezial set is given and it has 343 parts (excluding N&B), 50 fewer than before. From my manual of this period, which has pages virtually identical to the MCS ones, though the cover is different, there are similar reductions in the other 2 main sets. The Zwerg II outfit is no longer mentioned and Zwerg I has again been made slightly smaller, and is now called just Zwerg.

Details of this manual are as follows:

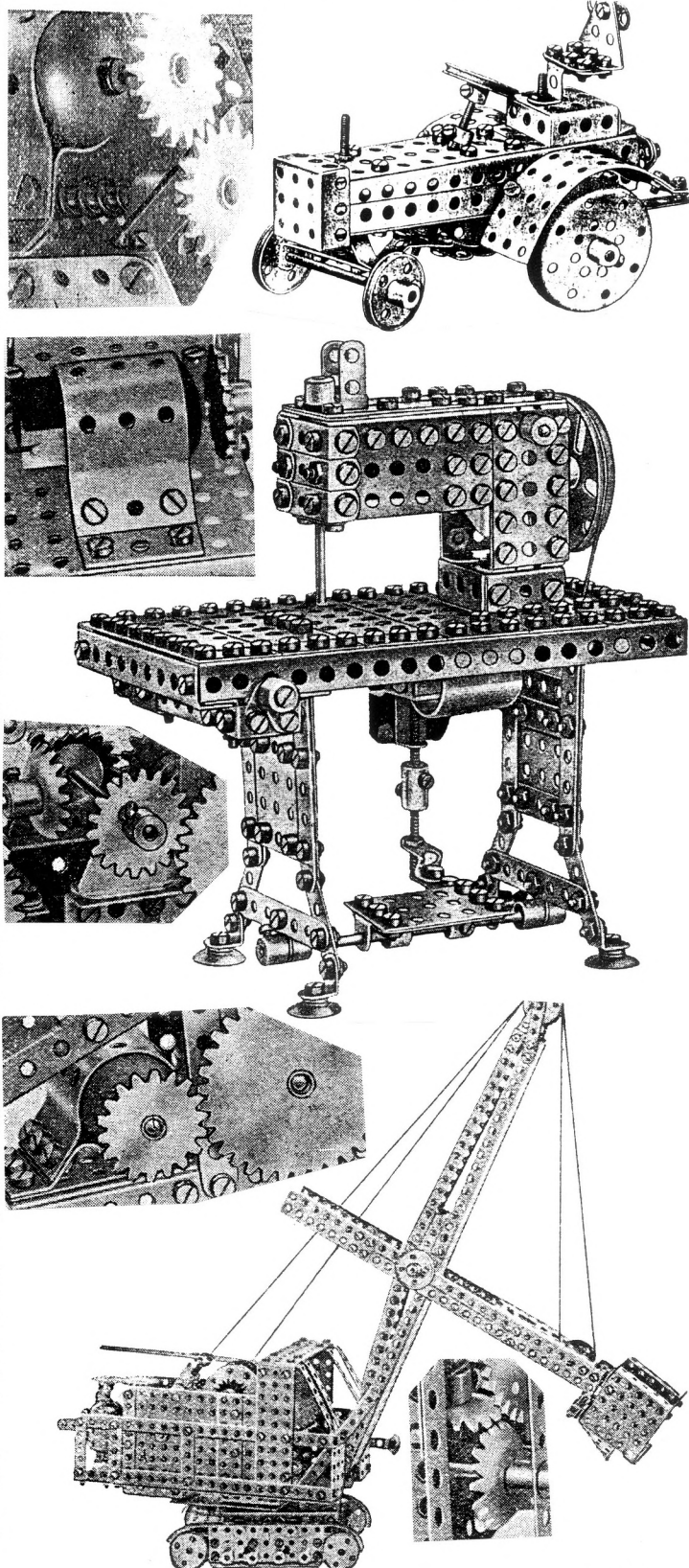
**SUMMARY OF MANUAL** •Name: Sonneberger Metallbaukasten. •Details of maker: VEB INJECTA STEINACH IN THÜRINGEN. •No dates/Ref Nos. •Page size: 200\*190mm deep. •No. of pages: 52 inc covers, unnumbered. •Language: German, Russian. •Printing: cover blue on yellow with black model; each model has black photo(s) on coloured panel. •Page Nos. of Illustrated Parts: 44,45 [no PNs]. •Page Nos. of Set Contents & highest PN: 46-49,49 [PNs vary between sets]. •Sets covered: Zwerg, Piccolo, Standard, Spezial. •No. of models for each set: 1,4,1,11 (+4 for Standard+Spezial). •Name, Page No. of first & last model of each set (no Model Nos.): Zwerg: Bogenleuchte,9. Piccolo: Schaukel,7; Briefwaage,15. Standard: Kartoffelroder,13. Spezial: Nähmaschine,19; Karusselldrehmaschine,43. Spezial+Standard: Förderband,27; Exzenter-Pressse,41. •Other notes: • Some models need parts from a Motor/Gears Set, but no details of it are given. • The name SONNEBERGER is on p3 but not on the front cover.

So, a manual very different to the earlier loose sheets, with only a few models for the smaller sets and many which need more than one outfit and/or the Motor/Gears Set (Elektro-mechanischen Getriebebaukasten), although manual versions of some of those models would be possible. The models are generally much better than the earlier ones with more working features, but the instructions for the more complex ones are even less clear, with a small, blurry photo of the finished model and a close-up of part, but only a part, of the innards. And there's no longer a list of the parts needed. Large holes can be seen instead of the earlier slots in all the appropriate parts.

No logo is used in this manual, nor as far as can be seen in the /FB one, but in both the slogan has been changed to Spielzeug unserer Zeit (roughly, Today's Toy). The /FB version is probably the earlier because the length

of the shorter smooth Axle is given, as it had been earlier, as 75mm, but in the 'Radar' one it has been altered (in different type) to 70mm, the length found in the sets described below. The models may differ too because the fairly elaborate Lathe on the MCS cover isn't in the 'Radar' manual.

Nothing is known of the Motor/Gears Set, but as well as the Small & Large Gears in MCS, the following can be seen in the models in the Manual: a Motor that looks like others found in East German sets, with a rounded front & a rectangular extension at the back, held in place by a Clamping Plate; a formed Bevel Gear that will mesh with the standard Gears; a TRIX-type wire Worm, and a Coupling with a tapped holes at each end but on opposite sides. The photos in the manual don't copy well, but all these parts may be visible in the models below and the snippets from other models around them. The Tractor is the one mentioned



earlier; the Coupling can be seen in the Sewing Machine; and the Navy is one of the larger models. The insets show from the top: the end of the Motor, 2 Small Gears & the Worm; the Clamping Plate; a Small Gear on the Motor, driving a Large Gear; Small & Large Gears, and a pair of Bevels; and another pair of Bevels. Notice the slots in the Flanged Disk used in the Sewing Machine - these can be seen in several of the models in the Manual but the illustration in the Parts List, and the parts in Richard's Set, see below, have the normal round holes.

Both David's Piccolo and Richard's Spezial sets are from this period and have similar lids; the Piccolo manual is missing but the Spezial has the Radar manual already described. The boxes are still red but all the top of the lid is printed in colour with a boy & girl behind the Navy shown on the last page, with real bucket excavators in the background. There's a product code in one corner: GHG Nr. 6510/3/4 // VEP MDN 34.80 on the Spezial. So 1980? No, because on the Piccolo: Artikel Nr. 6310/3/2 // VEP M 9.40. Again there's no logo and the old slogan is on both. The Piccolo box measures 12\*10\*1" and the parts are in a white moulded plastic tray. Both sets have plain aluminium parts but a similar Spezial set in EZ, with the same product code, has some coloured parts, as explained in OSN 15.

**The PARTS** What follows is based on the parts in the Piccolo and Spezial sets, both incomplete. **DATA** (in mm). **STRIP** (10-hole): •hole pitch/dia, 10.0/4.2 (but some holes in other parts 5.4); •width, 10.0; thickness, .83; •ends fully radiused, but with only about 1¼mm of metal outside the end holes. **BOSS**: •o/d, 10.0; •i/d, 4.10; •aluminium; •single-tapped M3. **AXLE DIA**: 4.00. **Mod**: 1.5 estimated. **NUT**: hex 7.0 A/F; **BOLT**: roundhead 6.9 Ø (mean); both

plain steel. **THREAD**: M4.

- The corners of all parts, other than Strips, and Brackets made from Strips, are square.
- None of the Strips (2,3,4,5,7,9,10,14,18h) have any large holes. The 14 & 18h ones are thicker at about 1mm, and the ends of most sizes are semi-radiused (r=6mm).
- The following holes in the Brackets are large: all in the Angle Bracket, the Reversed Angle Bracket, & the 1\*2\*1h DAS. The 3 centre holes in the 2\*1\*2h Double Bracket, and the holes in the lugs & the outer holes of the base of the 1\*5\*1h DAS. The holes in the 2\*3\*2h DAS, the Double Bent Strip, and the base of the Trunnion haven't been seen.
- All the holes in the A/Gs are large.
- The only large holes in the Plates and Double Strips are in the flanges of both Flanged Plates.
- The Gears have 18 & 35 teeth, and appear to mesh at 40mm centres.
- The 30mm Pulleys have a very sharp corner between the face and the 'V'; the Tyres for them are 45mm o.d. when fitted, and have SWL 29X8 moulded into one side. The small Loose Pulley is 10mm o.d.
- Collars are similar to the bosses, and are 8mm long.
- The shaft of the Crank Handle is 90mm long. As already mentioned the shorter smooth Axle is 70mm long. All Axles, including the Screwed Rods, are steel.
- The Bolts in the Spezial have bigger, 8mm Ø, fillister heads.

**VEB (K) METALLWAREN SCHMERBACH** This is the manufacturer given in EZ for the period after 1971, but I've nothing relating to it at all, and Schmerbach, if it's a town, isn't in my gazetteer.

## Further Notes on AMERICAN MODEL BUILDER

Don Redmond & Richard Symonds have very kindly sent samples of a number of AMB parts, & following on from the notes in 9/218, 11/278 & 14/395, the points of interest are:

- The **½" Pinion** has 14 teeth and is all brass (not nick-eled), but with a separate boss rivetted on, though the peening is almost flush with the face. The boss  $\frac{5}{16}"\text{Ø}$  by  $\frac{5}{32}"$  long, and is fitted with a **Grub Screw** about  $\frac{1}{8}"$  long, with a concave end. The **¾"**, with 20 teeth, is similar but the boss is  $\frac{3}{8}"\text{Ø}$  by  $\frac{3}{16}"$  long, and the Grub Screw is  $\frac{5}{32}"$  long. The **¾" Crown Gear** has 20 teeth.

- **Bosses** on other parts are also short,  $\frac{3}{16}"$  or up to  $\frac{1}{64}"$  longer, with little peening showing. The **Set Screws** seen have either cheeseheads,  $\frac{5}{32}"\text{Ø}$ ; or roundheads,  $\frac{3}{16}"\text{Ø}$ . Some with slightly larger roundheads may be ERECTOR.

- The **A/Gs** are quite similar to MECCANO but one or both of the arms of each of the 4 to hand are slightly wider. The MECCANO Flat Girder is  $1\frac{1}{16}"$  wide and a hypothetical AMB one would be  $1\frac{1}{8}"$ . Also the distance from the edge to the start of the slotted hole is about  $\frac{5}{32}"$  on the AMB parts and less than  $\frac{1}{8}"$  on typical MECCANO ones.

- The **½" Pulley** is  $\frac{1}{8}"$  wide and the 'V' is rounded at the bottom. The **Flanged Wheel, #4**, has a pulley groove and an 'internal' boss which is longer than the tread (the part that bears on the rail, is tread the right word?) by about  $\frac{3}{32}"$ , but nevertheless its Set Screw is angled slightly outwards. It is listed as  $1\frac{1}{2}"\text{Ø}$  but the pulley is  $1\frac{3}{8}"$  o.d. and the tread  $1\frac{1}{4}"$ . The **Car (flanged) Wheel, #65**, also has the boss on the inside, again longer than the tread, and the Set Screw angled. The tread is  $1\frac{1}{4}"\text{Ø}$  too and the o.d. of the flange proper is  $1\frac{7}{16}"$ .

- The **Angle Bracket** has a 9mm slot in one arm and often very little metal outside the hole(s) in one or both arms. #42, the **Spanner and Screw Driver** is stamped AMERICAN MODEL BUILDER.

Kendrick Bisset has also been good enough to send some notes on the parts he found in a 1914 #6 (1914 because it's in a cardboard box), and a #6½ in a wooden box with the 'new' parts in it, probably from 1915.

Later **Axles** had rounded ends, as described in the List of Parts in MCS/FB, but not those from 1914; similarly some have a transverse hole. The 1" was not listed after 1914.

The **Pulley Belt, #45**, is made up from a  $5\frac{1}{2}"$  length of Spring Cord, .094" o.d., very similar to the MECCANO pattern but wound 'left-handed' so that a right hand screw can be screwed into the MECCANO part but not the AMB version. One end is tapered to screw into the other open end, forming a ring of about  $1\frac{11}{16}"\text{Ø}$ .

The **Sprocket Chain** has  $3\frac{1}{2}$  links per inch, and is made from .031" wire.

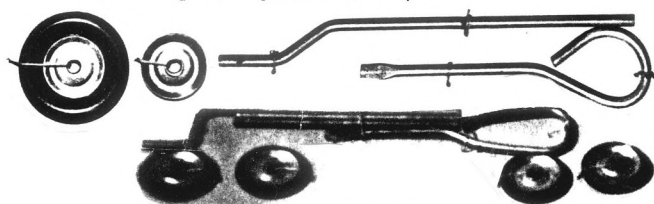
Don also sent some notes on manuals. The covers most often found are multicolour with a man, boy and Funicular Railway, similar to the one shown in MCS. But a manual belonging to John Wapshott is totally different with a matt grey cover printed mainly in black with buff highlights. There's still a man and a boy (with high button boots) but the model is a very simple Crane on Rails. On the cover is PATENT APPLIED FOR, and on the reverse is a 1912 copyright date. The illustrations of the models are fine-screen shaded drawings rather than the line drawings of later manuals, and at the top of each righthand page is MAKES MECHANICS EASY. The contents go from the usual simple Trucks on p2, to Fig.57, Wright Aeroplane, p44, and Fig.58, Ferris Wheel, on p46, followed by mechanisms, structures, and Parts List on pp48-56. Following on from 13/340 it seems very likely that this is a (or the) '**1912**' manual.

**The Patterned Wallpaper/Kling Cover** The cover in MCS has a yellow background with a red pattern on the wallpaper. In small print under the chair and model are The Kling Litho Co, Dayton, Ohio, and Copyright 1913; and at the bottom PATENT APPLIED FOR. This cover has been seen on the '**1913**' manual, and a very similar one on the '**1914**'. At the bottom in the latter case is PATENTED IN CANADA JULY 29, 1913, U.S. PATENT APPLIED FOR; and MADE IN U.S.A. is below the red outer frame.

**The Striped Wallpaper/Artcraft Cover** This variation has a light green background and wallpaper with buff vertical stripes on the light green, and no pattern. In the centre is ARTCRAFT LITHO CO, DETROIT, & the same 1913 copyright. The bottom wording is exactly as the '**1914**' above. Models start with the Alphabet on p3, and finish with Fig.369, Grandfather's Clock on p72, & Fig.370, Dutch Windmill, on p73. Mechanisms and the Parts List are on pp74-80. These details fit either the '**1915**' or '**1916**' manuals of OSN 13.

**Two PREMIER No.1 Sets** Roger Baker recently sent me a photo of an unused No.1 PREMIER outfit, and I found I also had one of another unused No.1 (courtesy Frank Beadle), and the two aren't the same. The red boxes are about the same size, roughly 10½"×9½", the labels that nearly cover the lids are identical, and in both the parts are strung to yellow backing cards. But some of the parts are slightly different, and the contents vary a little as well. Before going on, the label is in rich, vivid colours, with a boy standing beside a Tower that's slightly higher than he is tall, and in the background the earth with the Atlantic in the centre. Across the top 'EVERY BOY'S DREAM SET'.

The parts in the sets differ as follows: • The Flat Trunnions in Frank's have sharp corners; those in Roger's are properly rounded. • The Crank Handles are shown below, Roger's, the lower one, has 90° bends. • The Screwdrivers, also below, with Frank's at the top with the round handle. • The Rubber Rings on the 1" Loose Pulleys scale at 1⅜" o.d. in Frank's set (below, top), but are much thinner in Roger's. (The Pulleys are listed as 1" but Frank's scale at about ⅞" and Roger's at just under 1".)



The parts shown in both known manuals are like Frank's and his is almost certainly an earlier set. As mentioned in 16/457, little is known of PREMIER's history.

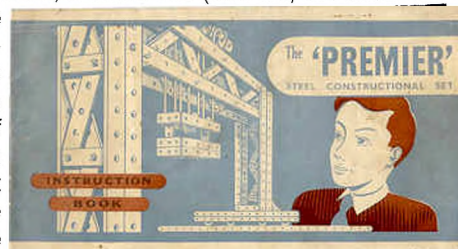
Since no Set Contents for PREMIER sets is available, I'll record the main parts in these No.1s. The early one has: • A 5\*11h Flanged Plate, and two 3\*5h Flat Plates (they look like Flexible Plates with holes only around the outside but are made of quite thick steel - mine vary from 21 to 42 thou). • 2x13h, 4x5h, 2x3h Strips; 1x1\*5\*1h DAS. • 2 Flat Trunnions, 2 Angle & 1 Double Bracket. • 4x1" Loose Pulleys with brass eyelet bushes & 2 Rubber Rings for them. • 1 Crank Handle, 1 Screwdriver, 1 (single-ended) Spanner. • A packet of small parts and at least one Axle tucked under the Flanged Plate.

Additional parts in the later sets are: • A 5\*5h Flat Plate. • 2 each, 3 & 9h Strips. • A 1" Fast Pulley. 2 Rubber Rings. (2x4" Axles can be seen). The Fast Pulley is unusual because instead of the usual double-tapped boss it is single-tapped with a smaller hole at right angles to it.

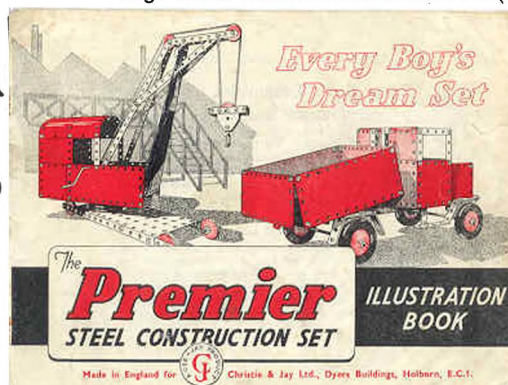
While writing about PREMIER it's worth mentioning some other points. Although its 69 parts include no Gears or mechanical elements, there are a number of unusual structural items. Among them are 2\*3h, 2\*5h, & 3\*11h Plates, each flanged along one long side, and the Flanged Sector Plates shown opposite at about ¼-scale. The larger one is the same pattern as TECNIKIT (10/250) but is, like all PREMIER parts, made of thicker than usual steel. Other unusual parts are 5\*5h Flanged Plates, & 21h long Strips & A/Gs. The latter have all round holes, and in fact there are no elongated holes at all in the system. The 8h Bush Wheel is 1¼" Ø, with the holes at 1½" radii; and there's a corresponding Wheel Disc with an eyelet bush in the centre hole.

PREMIER is easy to recognise because quite apart from the unusual parts, the holes, though at normal ½" pitch, are larger than usual at about 4.6mm. Both the 4BA N&B and the 4mm Axles rattle around in them. The Nuts are believed to be large and square, like VOGUE, but this needs confirming. The colours are distinctive too with the 1½" Pulleys and Flat Plates a light red, the other Plates a medium blue, and most of the other parts a lightish, fresh green. Some small parts are dull plated, including the 3h Strip. The 1" Pulleys in both No.1 Sets are tinplate, but others are found painted green.

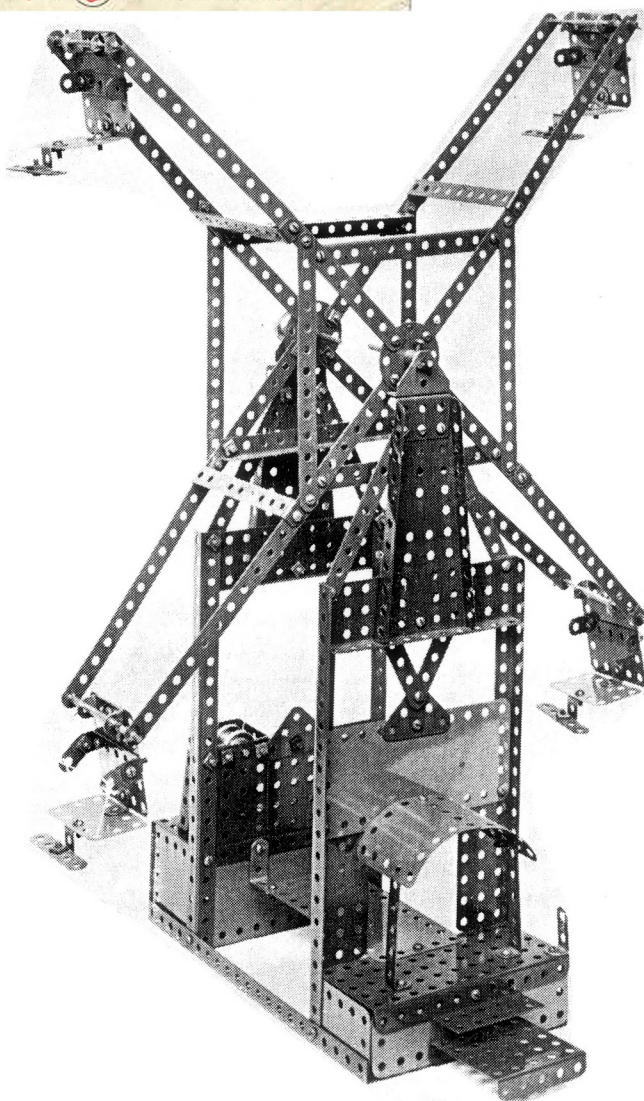
2 manuals are known, a small one (see 1/6, the cover is opposite), and the large one, summarised below, that is usually found. Both have one photo of each model with a few words about the prototype. The models in each are the same except that 3 models for Sets 4 & 5 are replaced in the large one. One of the new No.5 ones is shown below - no means of driving the 'wheel' can be seen.



**MANUAL SUMMARY** •Name: The PREMIER STEEL CONSTRUCTION SET •Details of maker: Made in England for Christie Jay Ltd., Dyers Buildings, Holborn, E.C.4. •No dates/ref nos: •Page size: 250\*184mm deep. •No. of pages: 20 unnumbered, inc covers. •Language: English. •Printing: Photos of models; cover red & black on white. •Page Nos. of Illustrated Parts List & highest PN: 17-18,W7a. •No Set Contents. •Sets covered: 1-5. •No. of models for each set: 4,4,4,4,5. •Name, Page No. of first/last model of each set (no Model Nos.): 1: Coster's



Barrow,3; Electric Truck, 4. 2: Railway Siding Crane,5; Breakdown Lorry,6. 3: Windmill,7; Motor Launch, 8. 4: Tower Trailer,9; Tipper Lorry,12. 5: Mobile Railway Crane, 12; Travelling Jib Crane, 16. •Other notes: an ad for the 'Powerful Magnetic Lifting Unit' is on the back cover.



**'New' System - E.Z.** Pronounced 'Easy' of course, given that it's American. Another find by Kendrick Bisset who kindly sent notes, photos, & photocopies. It's one of those small sets with aluminium parts, packed in a card cylinder (below), with marked similarities to the ALUMINUM CONSTRUCTION SET (ACS) & (see 17/467) GIRDER BILT (G B). The full name on the tube and model leaflet is Selfast's E.Z. "Little Mechanic", from Selfast Mfg & Distrib. Corp., New York 11, N.Y. There's no indication of date but no doubt it was from the immediate post-WW2 period.



The tube is about the same size as the G B one and is yellow, with a black diagonal stripe running around it, and with red bands top and bottom. Models in black are shown on the yellow parts.

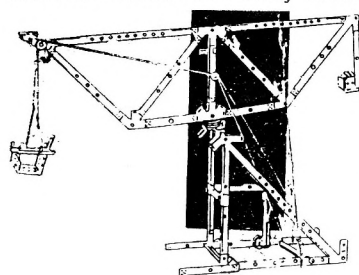
The main similarities with G B are: • 4, 8 & 16h Strips, called Girders in both systems. • Angle Brackets with 2 round holes, called Angle Bends in both. • The same black rubber 1½" Ø Wheels. • The same unusual Spanner (which is a proper fit on the Nuts in this Set). • Mostly identical models, see later.

The main differences are: • The E.Z. Strips though quite similar, have slightly larger holes and more rounded ends. • As well as the Wheels above, 1½" Ø Half Wheels are included, which are said to be 'for gear use'. They are .010" steel discs, painted cream, with a centre hole, and formed around the outer edge so that a pair back to back look as if they would form a pulley. • A 4\*7h Perforated Plate is supplied. It is 1.27mm thick with square corners, and is incorrectly described in the Leaflet as a '2"x4" plate'. • The N&B have a larger diameter thread.

• **DATA** (in mm) STRIP: •hole pitch/dia, 12.7/3.7; •width, 12.9; thickness, 1.63 (16h), 1.32 (4 & 8h); •ends near fully radiused. **BOSS**: •none. **THREAD**: 5-40 ANC. **AXLE DIA**: no axles. **DP (Mod)**: N/A. **NUT**: hex 7.8 A/F; **BOLT**: round-head 5.6 Ø; both steel.

A few parts were obviously missing from the Set but it is thought that the main ones should be 6, 16, 16 of 16, 8, 4h Strips, and 4 each of the Wheels and Half Wheels. The other parts found were 1 Plate, 13 Angle Bends, 1 Wrench, 7, 11, 6 of 1", ½", ⅜" Screws, and 26 Nuts.

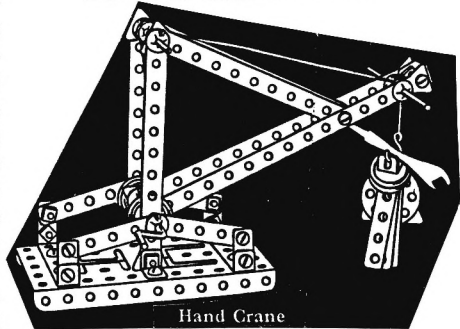
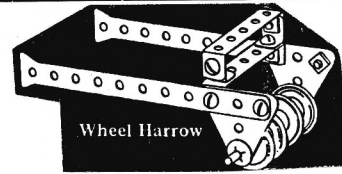
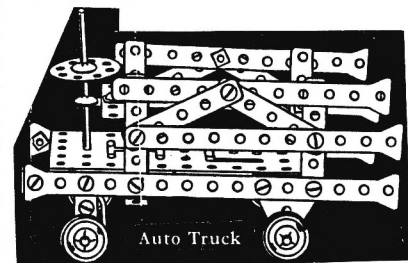
The Model Leaflet is a single sheet 142\*218mm, printed on both sides in black on white paper. Part of the front is shown above. 17 models are illustrated (plus A, B, 2 & 3) and there are 4 more, plus 2 repeats, on the tube. Most are in the ACS entry in MCS, including all the three shown in 17/467, but 2



on the Leaflet are actually MORECRAFT (see 16/432) models which couldn't be made with the E.Z. set. Very odd. One is shown opposite. The Plate and Half Wheel are not used in any of the models.

**Another HANDY CRAFT Outfit**

David Hobson has discovered an AUTO TRUCK outfit which is packed in a similar box to the WINDMILL set described in 16/453. The only difference is the name and model on the lid. With it was a manual which has 'Made from Handy Craft Set Nos. 1 and 2' at the top of each of the pages that show models. The front cover and the first pages are missing but all the models are present and include the OSN 16 Windmill, and the Auto Truck (above) that is featured on the top of the box. Also opposite, one of the simpler models and a more 'complicated' one. The more attractive looking Railroad Lift Bridge, shown in MCS, is on the inside back cover as an example of a Set 3 model.

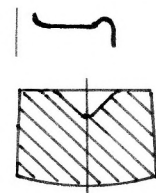


It was mentioned in OSN 16 that the Strips were made of soft steel and in the Introduction it is suggested that parts be bent & straightened as required. It is also explained that the foot of the Strips 'keep the bars from leaning'. This feature is only used in 3 of the 50 manual models, usually with Strips bolted inside the Flanged Plate, as in the Windmill in OSN 16. In practice many of the feet are too short to properly lock against the Plate, so considerable 'lean' is still possible.

**SUMMARY OF MANUAL** [front cover & 1<sup>st</sup> leaf missing] •Name: missing. •No details of maker but W.A.A.-7-26-15M on back cover. •Page size: 205\*142mm deep. •No. of pages: 16 inc covers, unnumbered. •Language: English. •Printing: models white line drgs on black ground. •No Illustrated Parts/Set Contents. •Sets covered: 1,2. •No. of models: 50 (all marked for Sets 1 & 2). •Name, Page No. of first/last model [no Model Nos.]: Pitchfork,6; Auto Truck,14. •Other notes: the front cover may be as in MCS; a No.3 model is shown on the inside back cover.

There are many more parts in the box than are needed to make any of the No.1/2 models in the manual. For example there are 2 Flanged Plates and 8x1" Wheels but no model needs more than half these quantities. So either the Auto Truck outfit contained a generous inventory (it is quite a large box remember), or extra parts/sets have found their way into David's box. As found it contained 4,8,20 of 15,11,5h Strips; 4 DAS; 8 Flat & 11 Angle Brackets; 2 Flanged Plates; 4 3\*3h Triangular Plates; 8x1" Wheels; 2 Wheel Discs, 3,2 of 3½", 1½" Axles; 2 Crank Handles; 25 Axle Stops; 2 Span'drivers; 45 N&B. The parts are as described in OSN 16 except:

• The Flanged Plates are a dark red, rather like the late 1920s Meccano shade, & the Wheel Discs are nickel. • The DAS and Angle Bracket are formed versions of the 7h Strips and Flat Bracket. • The 1½" Axles have square, sheared ends. Crank Handles have 3½" long shanks and are 4⅞" o/a. Like the Windmill Set ones they are pierced with a 2mm hole 1½" from the shank end. • A cross-section through the Wheel is shown opposite. • Also in the set is the cylindrical cast iron something, shaped as in the section opposite, that I'll call a Dolly. It allows an Axle Stop, placed in the hollow centre, to be easily pushed onto the end of an Axle; otherwise a hard straight push is needed. So it may have been a HANDY CRAFT part but it isn't mentioned in some notes in the manual on the uses of the Axle Stops.



**MYSTERY PART No.17** That's the Braced Girder in 7/156 with the solid diamonds centres. Don Redmond sent a photo of an Italian No.7 CONDOR Set (described on p497) and the Braced Girder in it looks identical except that it's a lighter red. MCS shows cut out centres but Don wrote that the Set contained all 3 lengths (5,11,25h), and all had the solid centres.

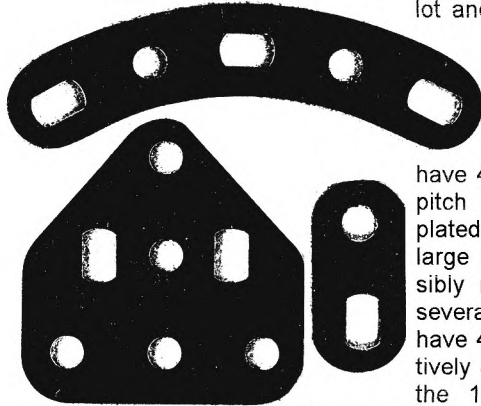
**MYSTERY PART No.30** Those black parts from 15/403 are, with the exception of the Spanner, in a Russian set with the transliterated name of KONSTRUKTOR-MEKHANI, that Richard Symonds has found in Canada. That's a different KONSTRUKTOR-MEKHANI to the one mentioned in 16/445. Full details elsewhere in this Issue.

**MYSTERY PART No.32** Don Redmond found more of these 6" long Braced Strips in a mixed lot at the Toronto Hobby Show, along with four 12" ones of the same pattern.

**MYSTERY PARTS No.34** The 4\*8h Flanged Plate, 4,8 & 12h Strips, etc from 17/475. I've now found one of the Flanged Plates & some Strips among a mixed lot, along with a 2\*4\*2h DAS & 4 of the unusual Flat Trunnions opposite (x .64). They are painted dark red like the Flanged Plate. The Strips are exactly as described in OSN 17, but the holes in my Plate are 4.3mm and those in the Trunnions are 4.1mm.



**MYSTERY PARTS No.36** These were found in a mixed lot and in addition to the Flat Trunnion, Curved Strip, and Flat Bracket opposite, there is an Angle Bracket corresponding to the Flat Bracket. All have 4.2mm holes at 12.7mm pitch and are bright nickel plated. The slotted holes have large radius ends. Other possibly related nickel parts are several 4 & 5h Strips, but they have 4.4/4.3mm holes respectively & are slightly wider than the 12.2mm of the Curved



Strip & Brackets. Don's Chart has 2 systems with similar Trunnions but neither has a comparable Curved Strip.

**MYSTERY PART No.37** A 9\*7h bright aluminium Flanged Plate from Richard Symonds with square cornered flanges on the 9h sides. The holes are at 10.0mm pitch and are 4.2mm Ø in the top but 5.4mm in the flanges.

**MYSTERY PARTS No.38** David Hobson showed me 3 parts that at first sight looked like the MÄRKLIN 8 & 9.5cm Flanged Discs, and the 6.5cm Flanged Pulley. Their overall dimensions are almost exactly the same but they are zinc die castings, and are painted green. The discs are about 2mm thick and the flanges about 1mm. Compare with the MÄRKLIN parts the holes & slots in the discs correspond but some of the slots are slightly longer, and the holes in the different parts vary from 3.7 to 4.1mm. There are holes instead of slots in the flanges of the 8/9.5cm parts, and the V-groove of the Pulley is near the disc instead of being in the centre of the flange. The Pulley's boss is single-tapped, probably M4 (a 5/32 BSW screw will go in but it's rather tight), and the bore is similar to that of the MÄRKLIN part.

**SMALL AD** **UMAKIT/CONSTRUCTO [2]** - some parts believed to correspond to this U.K. MECCANO-like system (see OSN 13/339) are available. Small lots of more than 40 parts, 19 different part numbers, but unfortunately very few strips. Some rust. Prices include post & packing: U.K. £4; Europe £5 (airmail); U.S.A. \$12 (airmail). Overseas, please send U.K. £, U.S. \$, or French Fr. David Hobson, "Woodington", Edford Green, Holcombe, Bath, BA3 5DB, England.

**A BURGSTÄDTER No.6 SET** A general survey of this East German system based on a No.7 Outfit was given in 12/324, and now some of the gaps can be filled in thanks to David Hobson, who lent me his nearly complete No.6. As was explained in OSN 12 this, like the No.7, is an accessory set which adds to the No.3.

The box measures 18 3/4 \* 12 3/4 \* 1" and the lid, and the tray for the parts inside, are similar to those of the No.7. The manual is identical, including the prices of the sets on the back cover and the printer, but the PR is III-8-9 Ke 86/81.

Before getting on to the 'new' parts, a few comments on the notes in OSN 12.

- The 'black' parts in the No.7 (seen under some rather unusual artificial light) looked a rich black colour, but the No.6 ones appear to be a very, very dark grey.
- The width and end radius of the different lengths of Strip in the No.6 vary slightly from 12.0-12.1mm, & 6.4-6.8mm.
- The dimensions of the Collar & Coupling given in OSN 12 are probably wrong and should be, as for the parts in this set, 10.0mm Ø for both (smaller than the bosses), and 7 & 20mm long respectively.

Now the parts not mentioned before. Unless noted otherwise all are black and look like the SCHEFFLER ones in MCS, - most can be seen in the illustrations in OSN12.

- The 5\*11h Flanged Plate with a 3\*7h cutout, & the 6\*6h one with no cutout, are both painted medium blue, though in different shades. Both have round holes in the flanges, and well rounded corners, fully radiused on the 6\*6h. All holes are 4.1mm Ø, slightly less than in the other parts.
- The 3\*7h Perforated Plate is just like the 3\*3h. The 2h Triangular Plate is the MECCANO #77 pattern.
- The Curved Strips are slightly under 10mm wide; the end holes are 8mm long slots, and the centre slot is 32mm.
- The 1\*5\*1h DAS has round holes in its lugs but the outer holes are elongated to 8mm. The Reversed Angle Bracket has its outer holes similarly slotted. The Double Bent Strip is MECCANO-pattern and the Double Bracket is the wide sort, about 20mm across. There's also one of the deep MÄRKLIN-type (below), of normal width but with 3 holes in the sides, & the pair near the base one at 1/2-standard pitch.
- As mentioned in OSN 12 the Flat Girders have alternate holes and (8mm) slots, see below, and the ends are cut half way through a hole/slot, with no rounding of the corners. The 4 lengths of 3,5,7 & 9 holes refer to the number of complete holes/slots. The part is 25mm wide.
- The Sprockets are nicked steel with 20 & 35 teeth, Mod. 2, and 44 & 74mm Ø o/a. The large one is flat with a 35mm Ø centre hole and no boss; it has 4 holes at 25.6mm radius in the face. The small one has a standard boss. The teeth are 'gear' shaped but the parts don't mesh at standard centres. They are not illustrated in the Manual, and their only mention is in the Set Contents.
- Apart from ordinary Axles there's a 37mm one threaded over 20mm at one end, and one 75mm long with 20mm of thread at each end.
- The 2 Pawls in the No.6 are a RH & LH pair, and one is shown below. The Strip Bearing (below), like a long MECCANO Rod & Strip Connector, is a sliding fit on the Axles. Like the Pawl, and the Sprockets, its use is not shown in the Manual. The Hook (below) is flat, 25mm o/a, and is not the 'S' shaped wire one in MCS. The Crank (below) has a 10mm Ø boss; the web has a hole at 12.8mm and a 20mm long pin at 20mm radius. The 14mm Ø Loose Pulley is white plastic with a much deeper vee than the nickel Fixed version (9.0mm Ø against 11.3).

The parts that haven't been seen are the 2 & 25h Strips, the Flanged Sector Plate, the Windmill Sail, the Crank Handle and Crankshaft, the Tyres, and the Sprocket Chain.



**FAC** This was the post-WW2 Swedish system that was primarily aimed at industry, although two small 'toy' sets were produced in the early days. FAC first appeared in 1952 and seems to have continued into the early 1980s. This account is based on various items of literature and photos, including some early material from Chris Freeman, manuals from Geoff Wright, and a large set that Colin Reed lent me for an extended period, so that I was able to get to know the parts and make some models. Thank you to all three. The set dates from before the introduction of the '1964' parts (see below), but some of the improved Gears, and a few other later parts had been added to it.

Before launching into detail, a preliminary sketch of FAC. Structures are made using 4mm Rods or Beams (opposite, essentially 2 Rods at 14mm centres joined by a web containing long slotted holes), or often a mix of both. They are held together by the range of Clamps opposite - some called Clamps, some Couplers, and some Clips).

The basic spacing of the Rods is 7mm centres, chosen because it just gives room for the M3 Bolts to pass between 2 Rods, but holes are more usually at 14mm centres.

Frames can be spaced apart using Rods or Beams but Threaded Rods are also widely used. These are 4mm Rods with each end turned down over 10mm and threaded M3.

Another element is the 2.5mm Ø Tie Rod (opposite), which is often used as cross bracing in frameworks. A neat structure can be made with frames made entirely of Tie Rods with Threaded Rods as cross members.

Fully perforated Plates with rows of slots like those in the Beams, spaced apart at 7mm, but with alternate rows staggered, can act as bases for structures, mechanisms, or subassemblies.

Both 4 & 6mm Shafts are used, and they run in special journals, both brass and ball bearings. In addition there are 6mm Tubular Shafts, and Grooved Shafts to allow Gears, etc to slide along them.

Among the many mechanical parts is a wide range of Gears and Sprockets.

**HISTORY** The earliest literature, a manual for the Nr.1 Set, dates from 1952 or soon after, and a Price List from about then shows 110 parts, including all the basic structural components but with relatively few mechanical items, and no Plates or large circular pieces. Manuals for Sets 1 & 2 are listed, but no other sets are mentioned. This is rather surprising as the 1 & 2 are toy sets, albeit technically oriented, but the parts in the List go beyond 'toy' items, with Rods of up to 2m long for instance. So were there 'industrial' outfits at this stage, or did industrial customers just buy parts as required?. Prices in the List are given for both single items and larger packs. Both the Manual and the List carry the name of the company, Mark Sylwan AB, Hornsgatan 89, Stockholm Sv.

By 1959 the system had grown to 158 parts and these are the ones shown in MCS/FB. 2 large industrial outfits, the X1 & X2, were available and as far as is known no toy sets were being made. Agents in 12 countries were listed in the manual, as well as a General Agent, Transitoria Trading Company AB, Kungsgatan 29, Stockholm C.

Transitoria is the only company mentioned in a 1964 manual but with a new address - Gjörwellsgatan 15, Stockholm K. Sylwan is credited as the inventor of the system and for preparing the manual. It is in 2 parts and is mostly entirely new, the revision being needed to reflect the major changes that had been made to the system. A few parts were discontinued, but many were improved, and many more were introduced, giving a total of 214. The sets were changed too and now there were three, with a Standard, a Structural & a Gear Kit. Listed on the back cover of the second part are the patent numbers in 14 countries.

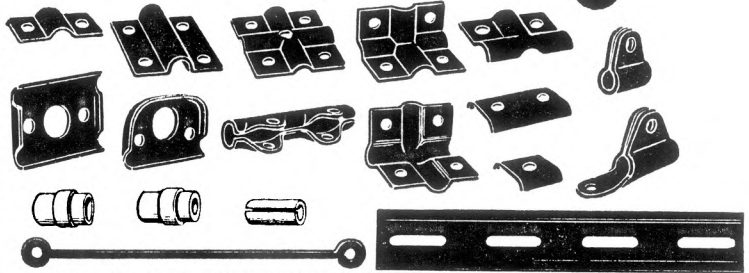
A 1965 UK Price List shows all the 1964 manual parts but has been amended in ink, 'Valid from 1/1/70', to show a some changes in the contents of the sets & the deletion of a

few parts. It was from Technical Prototypes Co., 535 Bradford Road, Huddersfield, whereas the agent in 1959 had been Weyco (Sales) Ltd., 19-20 Dames Road, London E.7.

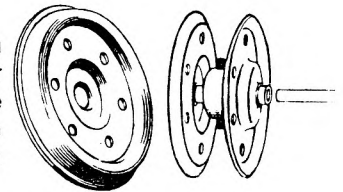
The first part of a 1975 manual is identical to the 1964 one, but is under the name of FAC Systems AB, Floravägen 6, S-80228 Gävle, Sweden, and Sylwan isn't mentioned. The second part, which lists all the parts, isn't available.

## FAC in about 1953

**The Parts** The range of parts comprised:  
• The 13 Clamps shown below.



- 4mm Rods in 19 lengths from 18 to 386mm, plus 500, 1000 & 2000mm.
- 4mm Threaded Rods in 7 lengths, from 30 to 90mm o/a.
- 8 Tie Rods (above) made from 2½mm rod, with formed eye ends (like PRIMUS), at 18.5 to 170mm centres.
- 6mm Ø Shafts, 68, 120 & 180mm long.
- 14 Beams (above) from 23 to 386mm long (1 to 14 slots). Later ones were rolled but none are known from this time.
- 4 & 6mm bore Bushings, shown above under the Clamps with the large centre hole. A pair of either of the latter hold either of the Bushings, and clamp onto 4mm Rods.
- A 12mm long, 6mm o.d. Split Sleeve, 4mm i.d. (above, to the right of the Bushings). This can be used in any part with a 6mm bore to allow it to be held to a 4mm Shaft.
- 4 & 6mm bore Collars. 6mm o.d. Sleeves, 5, 12 & 20mm long, bored 4mm. These can also be used as bearings when held between suitable Clamps. A 2mm wide Spacer for 6mm Shafts, 8mm o.d.
- A 46mm Ø, 6mm bore Bush Wheel with a 6-hole disc, 2mm thick. 111
- A 4mm bore, 16mm Loose Pulley.
- A 42mm Half Pulley with a 6mm centre hole. A pair bolted together (opposite, right) can be held to the Shaft by a 6mm bore Collar between them. On a 4mm Shaft a Split Bush is used inside the Collar.
- A 54mm Flanged Disc (above). It can be bolted to the Bush Wheel, or the Half pulley.
- A Tyre to fit the Half Pulley, and another, 104mm o.d. for the Flanged Disc. Both are shown with FAC SWEDEN on the side walls.
- 7 Mod.0.7 Gears with 16,24,32,48,64,80 & 96t (12.6 to 68.6mm Ø), and all with a 3mm wide face. The smallest is bored 4mm and the others 6mm. Probably all are made of steel. The larger ones have 6 holes in the face. A steel 2-start Worm and brass Worm Wheel giving a 22:1 reduction. A small Bevel, and a pair giving a 3:1 ratio, all in brass.
- Cheeseheaded M3 Bolts, 6,8,12,19mm u/h, with 6mm o.d. Washers, and hex Nuts. 5mm long M3 Grub Screws. An Eye Bolt (opposite) with 12mm of thread. 4mm Ø Tapped Sleeves, 5.2 & 12.2mm long, tapped M3.
- A Crank Handle, 10cm long, with 90° bends; a 10x15mm Spring; a flat Hook (above with the Clamps); a black handled Screwdriver; a 2-ended Spanner, cranked at one end.



Bosses and Collars appear to be double-tapped across a diameter. 4mm Shafts aren't listed so presumably the 4mm Rods also served as axles.

**The Nr.1 Set** It is packed in a cardboard box which scales at 31\* 23cm, and is divided by card partitioning into 16 areas, large and small. The lid is red with FAC in yellow



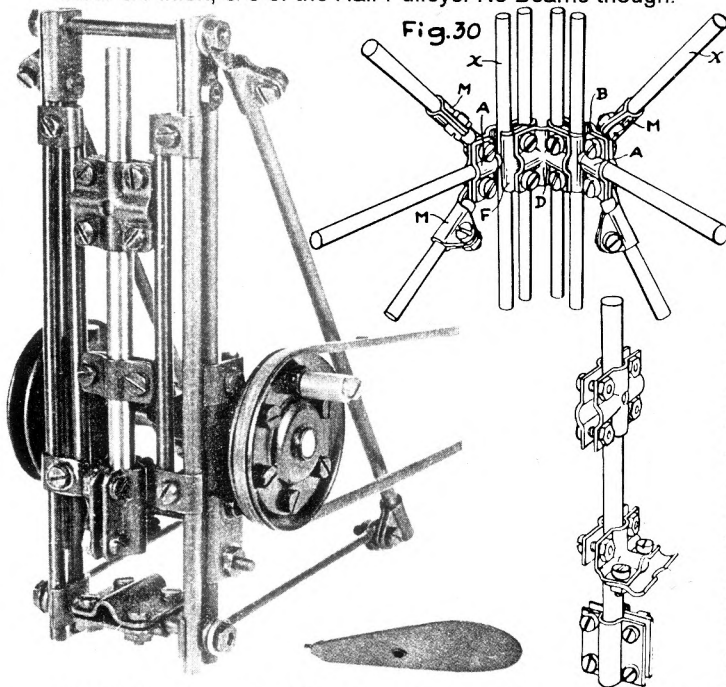
and large line drawings of a Crane and Motorcycle in white.

Details of the contents are given in MCS, and broadly consist of 48 Clamps, 30 4mm Rods up to 218mm long, 3 Threaded Rods, 6 Ties, 2x6mm Shafts, 17 Collars, Sleeves, etc, 4 Half Pulleys, 1x16mm Pulley, 2 Tyres, a Hook, a Crank Handle, & some 80 N&B. All the parts look black except the bright Tools & 6mm Shafts, and the brass Sleeves.

As well as a manual the set contains a card about the size of the box, with 3 Windmill Vanes & a Balance Scale printed on it. One Vane is shown by the Hammer below.

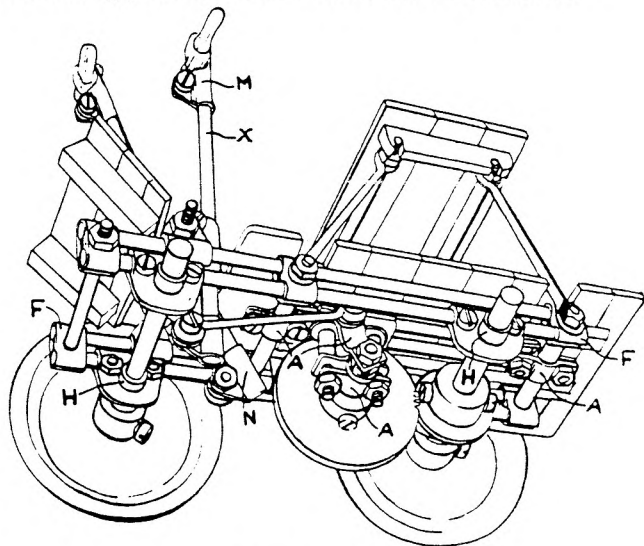
**The Nr.1 Manual** Including the covers, It has 24 unnumbered pages, 207\*144mm deep. The cover is shown in MCS and has a B&W photo of a small Crane, similar to the one on the lid, with FAC in red at top left, and under it KONSTRUKTIONER in small letters, the only time the name is used. On the back cover are reprints of 7 press reports on FAC, all from 1952 and the first dated April 26. Like the rest of the manual they are in Swedish.

The inside covers show some of the parts, the set contents, and some basic constructions - with 3 more pages of the latter following the Introduction. After that come 11 models, from a Skottkärra (single-wheel Barrow) to the Smideshammare (Trip Hammer) below left. For most a photo and a sketch or two, in many cases illustrating how to make good use of the parts. The models include a Telfer Span, a Winch, & a 3-Wheel Truck with a pivoting front wheel - all are fairly simple really but a child with a mechanical bent would probably find them interesting to make. However there might not be much scope for more ambitious models from the parts in the set. To show the way ahead a photo of a Hammerhead Crane made from a Nr.2 is included. It's still quite small but among the parts are a Gear & Pinion, & 8 of the Half Pulleys. No Beams though.



**The Patent** David Hobson kindly gave me a copy of the UK Patent, No.745129, in the name of Mark Christopher Sylwan, Swedish, of Kopmangatan 10, Stockholm. The application was made in May 1952, and the patent granted in 1956. The Beam is defined (without the later centre hole in the slots), and its importance stressed, but the figures relate mainly to structures made of Rods. Most of the Clamps already shown are used, including the 2 that can hold Bushings, to form bearings. It is said that the building system described could be used at full scale as well as for models. Much is made of the way that Clamps can be bolted one to another to allow, for example, the corner joint shown above (Fig.30). No mention is made of mechanical assemblies but to illustrate 'the versatility of the construction set', a working model of a lever-operated toy Railway

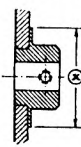
Trolley is shown (below), without any description. None of the decking parts are known from other FAC literature.



FAC in 1959

**General Notes on the Parts** The thread is M3 and as most of the holes are intended to take Bolts of this size, they won't accommodate the smallest (4mm) Shafts used.

All parts are steel unless otherwise noted. Most bosses are steel and 14mm Ø, but unless the part is machined from the solid, each has a thin 21mm Ø (X in the illustration) flange which sits against the face of the part and allows other bolted on parts to locate on it and so run concentrically. The 1953 illustrations don't show this feature.

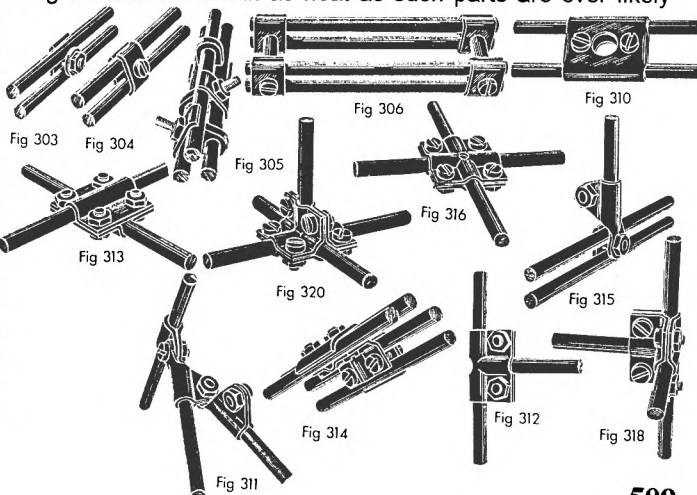


Another change is that bosses have 3 radial holes at 120°, 2 tapped for Grub Screws, and a pilot hole to allow the Shaft to be drilled, if required, to take a 1.7mm Roll Pin.

The only parts to have bosses are Gears and the Bush Wheel (called a Disc Hub). All the other circular parts are either attached to built-up hubs or sometimes, the Bush Wheel. Many of the circular parts are pierced with one or more rings of holes and there are usually 6, or multiples of 6, holes in each ring. The radii of the rings are multiples of 14mm, that is twice the basic 7mm module.

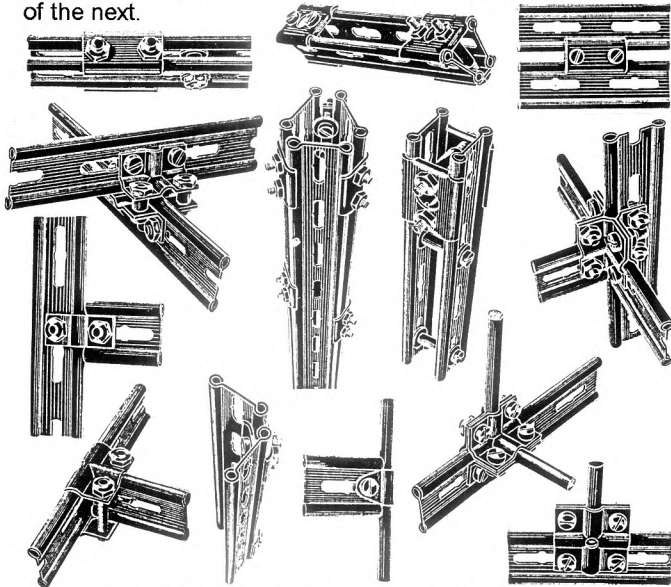
4 & 6mm Shafts are supplied and while some parts are in both sizes, many are bored only for 6mm, and inserts are provided to allow them to be used with the 4mm Shafts.

**Structures** The 4mm Rods are now in 8 lengths from 24 to 136mm, plus a 556mm one. (As with all parts the user is expected to cut to size as necessary.) 19 examples of joints are given in the manual and some are shown below. Notice the Inside and Outside Angles in Fig.318, and the Short Clamp used with a Washer (Fig.303), in pairs (Fig. 304), and to unite 3 Rods (Fig.305). The holes in the Clamps that have 2 N&B are at 14mm pitch. The pair used in Fig.310 are the 1953 type, but this part now has an elongated centre hole (PN L8-02). The Clamps are well designed and are about as neat as such parts are ever likely

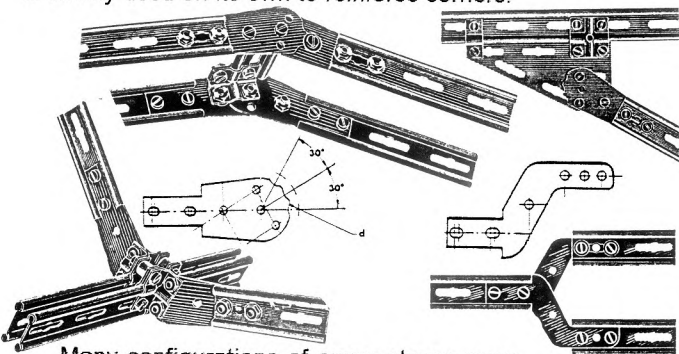


to be. They are made of 1mm thick steel and when the clamping Bolts are tightened up fully the joints are solid and strong. However although I didn't ever strip a thread, the degree of tightening needed sometimes felt excessive for the diameter of the Bolts.

Beams are rolled from .8mm steel and are very rigid. 20 lengths are now listed with the longest increased to 556mm (20 slots), and each slot has a 4mm hole in the middle to allow a Rod or Shaft to pass through. Some of the ways shown of joining the Beams and forming composite girders are reproduced below. Again it all works very well but a Clamp that is attached to a Beam by 2 Bolts can only be positioned at 14mm intervals along it, with the Bolts at either end of one slot, or at the end of one slot and the start of the next.



2 new parts are meant for use with the Beams to allow them to be offset and joined at an angle. They are shown below with some examples of the many ways in which they can be used. The notches at the end of the End Plate allow a pair to be locked together at 30° & 60° to each other. This part can also be used with a Triangular Plate, as below, to allow Beams to be joined at an angle. The Triangular Plate is widely used on its own to reinforce corners.

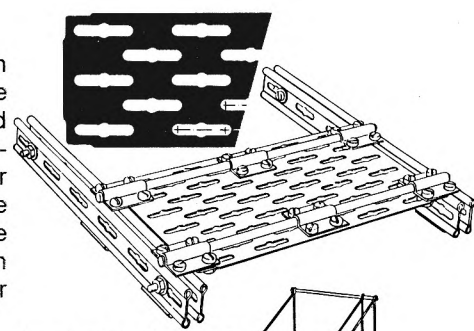


Many configurations of super strong members can be built up and one simple example using 2 Beams is shown opposite.

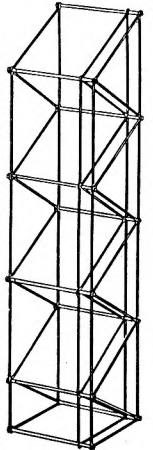
The Threaded Rods are very useful parts and a typical use has already been shown in Figs.306. The 2 lengths of Tapped Sleeve add greatly to their versatility, the short one reducing the outstanding length of thread on the end, and the long one covering it completely. Thus a Rod can be threaded at one end and plain at the other. It's all very versatile but the Sleeves are not that robust and a number in the Set were damaged in one way or another. The longer ones are also used to join Threaded Rods but they aren't really strong enough if the composite Rod is subject to much bending. 6mm o.d. plain Sleeves can be used over the Rods to reinforce them, as can Tubular Shafts which are available in longer lengths.

As already mentioned the Plates are fully perforated and 5 sizes are listed, from 38\*80mm to 136mm square. All are

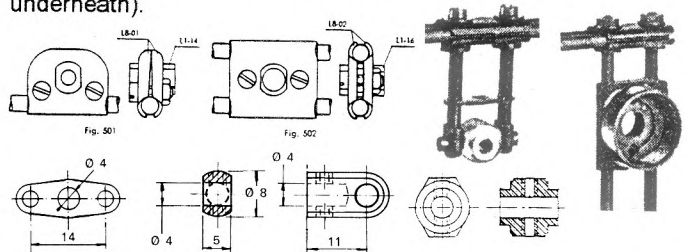
made in both 1 and .6mm thick steel. They can be used within structures and an example is shown opposite, with Rods used for stiffening. In addition there was a large Flanged Base Plate, 252mm square, often used as the foundation for frameworks.



The Tie Rod is now made from a length of rod with the ends stamped flat to accommodate the 3mm end holes. It is still listed in 10 lengths (19.8 to 158.4mm centres) but these have been revised to allow lattice structures to be made up based on isosceles triangles. They are most neatly fitted using Threaded Rods as cross members, as in the framework opposite.



**Bearings** There are now more than one type of plain bearing. Figs.501/2 below show the Bushing Clamps with the brass Bushing trapped between (but now modified to fit the elongated holes in the Clamps. An alternative is the newly introduced brass Shaft Head (either 4 or 6mm bore) bolted between 2 Eye Screws (below centre with the Head itself underneath).



The steel 3-Hole Link (above left) that is used to space the Rods in the Shaft Head bearing, has a 4mm centre hole and this provides a much simpler bearing by, for example, standing it off with spacers on one or both sides of the centre hole in a slot in a Beam. Also if long Bolts are used in the Bushing Clamps the Link can be fitted at their ends to act as a steady. There is no equivalent for 6mm Shafts.

Another part sometimes used as a 4mm bearing is the 5mm thick, brass, Rod End (above centre), which is double-tapped for Grub Screws to secure it on the end of a Rod.

A 19mm o.d. Ball Bearing with 6mm bore is provided, with a nylon Insert to allow use with 4mm Shafts. It pushes into a cast alloy housing (called a Ball Bearing Box), only 22\*23.5\*12.4mm deep, which has a plastic push-fit cover. The Box has tapped holes in its back face and can be clamped onto any pair of Rods at 14mm centres by a standard Bushing Clamp. An empty Box is shown above right. It's a splendid unit and there certainly ought to be a MECCANO equivalent.

**Circular Parts** The range of Pulleys has been extended but is still not extensive. In addition to the 16mm Loose Pulley there's a similar one bored 6mm which can be fixed by a Grub Screw running in from the bottom of the vee - it can of course be used with a Split Sleeve on 4mm shafts. Added to the 43mm Ø formed Half Pulley is a similar part but with 6 'spokes' pressed into it. The new Shaft Head can be clamped between a pair of either of these to provide a tapped boss. It's very neat but to relocate a Pulley fixed to a Shaft it has to be dismantled, the boss moved, and then the Pulley bolted up again. A Ball Bearing can also be clamped between the Half Pulleys.

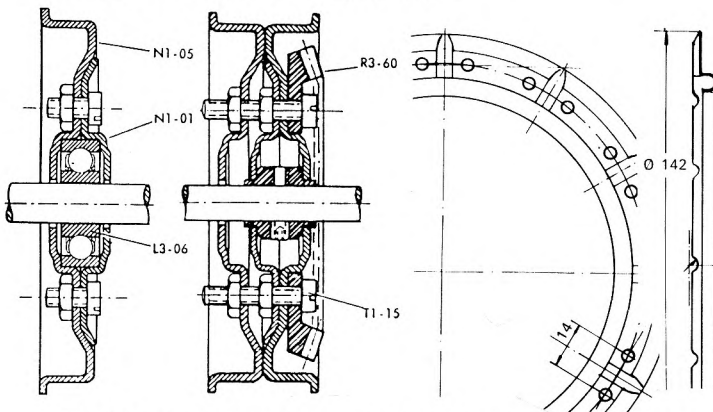
When used in pairs the 54mm Ø Flanged Disc and the (new) 88mm Ø Flanged Rim can take a flat belt of up to about 15mm wide (or provide a very small vee groove, but they were probably not intended to be used like that).

The 54mm Flanged Disc is the smallest part that can be used as a flanged wheel and it is shaped to allow a Half

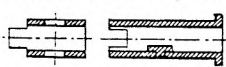
Pulley to be bolted to it, or more usually a pair with a Shaft Head or Ball Bearing between them. The 88mm Flanged Ring is bolted to a 63mm Ø flat Disc Web, which in turn is bolted to the (very heavy) Bush Wheel. (2 of the 6 holes in the face of the latter are now 4mm rather than 3mm to allow Shafts to pass through in certain applications.)

The other new circular parts are a 63mm Ø, dished, 3-spoke Hand Wheel, with a hole in the rim for a handle, and a Slewing Ring with 12 pairs of holes on a 126mm pcd. Its use isn't explained but it is probably meant to run on 16mm Pulleys. A drawing of a section of it is shown below, right.

Naturally it's possible to combine the circular parts in different ways, and other parts such as Gears can be bolted to them. Shown below are a simple flanged wheel with a Ball Bearing hub, and the same assembly but with a Shaft Head between the parts, and a second Flanged Disc bolted on one side and a Bevel on the other.



**Shafts** There are 4 types of Shaft: 4mm solid; 6mm solid; 6mm tubular, bored 4.1mm; and 4mm with a groove in it 2mm wide by 1.2mm deep. All are in 556mm lengths, to be cut as required. The range of brass Collars and Sleeves is similar to 1953 but additions are Fixed and Sliding Dogs (below) to carry Gears. The Sliding type has an internal key



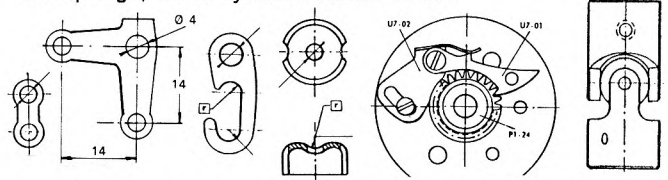
about 4mm long which engages the Grooved Shaft. There's also an M6 Lead Screw, a Lead Nut, and a 9mm Ø screw on End Fitting bored to provide a 4mm bush.

**Gears** The 7 steel, machine cut Spur Gears remain unchanged apart from the modified boss pattern. They are all shown with a 3mm wide face, but all three 16t ones in the Set are only 2½mm, and while one has the expected 3 holes in the boss, the second is double-, and the third single-tapped. Remnants from the early days? Most of the Gears do not mesh at centres which are multiples of 14mm, but because of the method of mounting the bearings, this isn't usually a disadvantage. Gears fastened to the Sliding Dog are moved by a short Rod which acts between the flange on the end of the Dog and the outer face of the Gear's boss. New Gears, both steel, are a 64t internal Gear Ring, 3mm thick, & a 77mm long Rack, 4mm thick, with 35 teeth and keyed ends. The Worm Wheel is now of reinforced fabric and has 40 teeth. The brass Bevels continue, and the 3:1 pair have 20 & 60t. The latter has no boss but is bolted to any suitable part. 2 Sprockets with 14 and 28t (25 & 45mm Ø) are listed, & Ladder Chain to run on them.

**N&B** The M3 Bolts have slightly tapering cheeseheads of 5.3mm Ø, or a little less on some, with (now) 6,9,15 & 24mm u/h; the pressed hex Nut is 5.9mm A/F by 2mm thick. The Washer is 8x.8mm. There's an extra Grub Screw, 2.75mm long, and slotted & Allen types are listed for both lengths.

**Other Parts** Not mentioned so far is a very useful Link with 2 holes 7mm apart; a small Bell Crank; a different flat Hook, 22.5mm o/a; a 42mm Ø steel Cam Blank, 2mm thick, marked with concentric circles 1mm apart; a Seating for the strong 10mm Ø Compression Spring; a Tension

Spring 278mm long; a Ratchet Pawl and Spring for it; a Universal, 11mm Ø & 26mm long; and an additional Tyre, 26mm o.d., to fit the 16mm Pulley. All but the Cam Blank, the Springs, & the Tyre are shown below.



**Quality** The parts are well made and most have a durable black metallic finish. The exceptions are the plain steel Shafts, Gears, Bush Wheel and Cam Blank; and most of the small brass items. Most parts aren't marked but some of the Clamps and Gears are stamped FAC. Tolerances are given in the manual and the clearance between the Shafts and the bore of the Gears works out at .0008" ± .0008". For non-critical holes the maximum variation is ±.0014". My only serious criticism are the pressed Nuts, which, like all such, do not always have the bore exactly normal to the base, and that can lead to a screwed rod locked to a plate by two Nuts, being askew enough to matter.

**The Manual** The manual (PN Z1-04) has 78 ring bound A5-size pages plus covers, and in the introduction Mark Sylwan hopes that users will have as much pleasure working with FAC as he had developing it. The book is divided into 7 chapters dealing with structures, rotary movement, gear trains, etc, followed by dimensioned drawings of all the parts. The PNs are all different from the 1953 ones. There are no detailed instructions, but instead, for some 2 dozen models or mechanisms, a photo or two, with perhaps a drawing of a detail, and a limited discussion of one or two of the main features and some of the parts. I found it difficult to pick up quickly how some components were meant to be used and I found myself wishing for a 'How to Use FAC Parts'.

Quite advanced mechanisms are shown such as a Mechanical Integrator and a Torque Amplifier, as well as other more usual, though quite complex, models: for instance a Gang Saw, and a large Travelling Bridge Crane. Both the latter are shown in MCS and they are really the only photos of large models that show worthwhile detail when copied. But below and overleaf are the details given of some of the more straightforward mechanisms. The 4mm bore Shaft Head is the main part in the Connecting Rod End and Tapped Sleeves are fitted to the Bolt that holds it to the Bush Wheel and those through the Eye Bolts. Eye Bolts (T3-12) are also used in the other gear assemblies. (The Eye Screws referred to are what I've called Eye Bolts.)

Fig. 703. — Gearbox with three forward speeds and one reverse, with reductions 1:1, 1:2, 1:4, and reverse 1:8, using Gears P1-16, -24, and -32. Two countershafts are employed; Plates C2-52 are used as end plates.

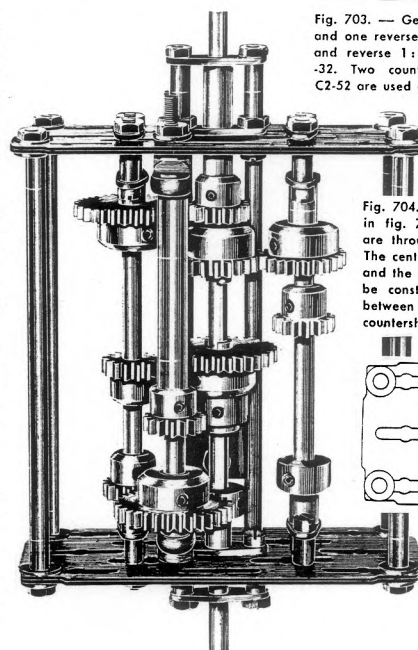
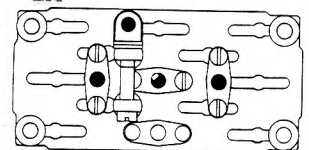


Fig. 704. — Shaft arrangement of the gearbox in fig. 703. Only the input and output shafts are through shafts, carried in Three-Hole Links. The center distance between all shafts is 2.4 m, and the supports of all other shafts must therefore be constructed. The countershafts are installed between Three-Hole Links, and the reverse countershaft by means of Eye Screw supports.



**FAC**

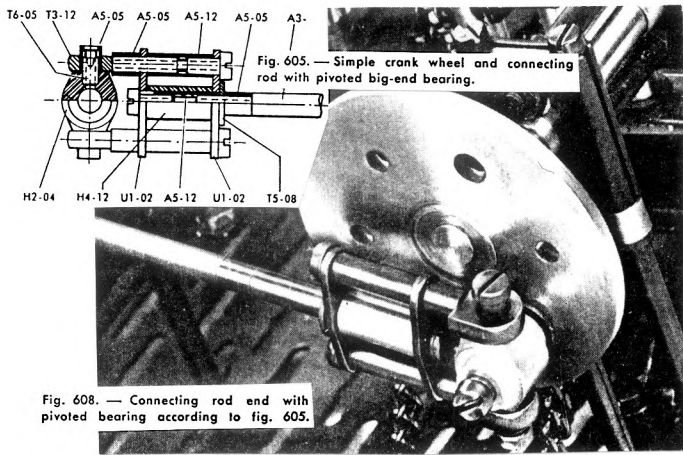


Fig. 605. — Simple crank wheel and connecting rod with pivoted big-end bearing.

Fig. 608. — Connecting rod end with pivoted bearing according to fig. 605.

Fig. 711. — Bevel gear drive and differential suitable for self-propelled vehicles, as used in the railcar bogie of figs. 430 and 618.

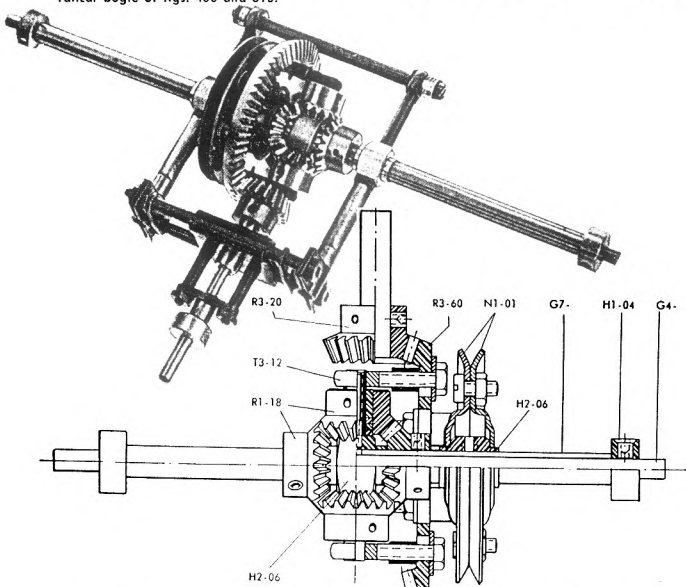


Fig. 712. — To build the differential in fig. 711, begin by assembling Wheel Discs N1-01 and Shaft Head H2-06; then install four Screws T1-15 fitted with Tapped Sleeves A5-05, and use Sleeves H4-05 and Rings H3-04 as spaces between Wheel and Crown Gear. Take care that the wheel is correctly mounted on the shaft and does not wobble. Then mount Crown Gear complete with satellite shafts. The satellites are fitted with a Sleeve H4-05 and three Rings H3-04 each, serving as bushings. When mounting the Eye Screws holding the satellite shafts, check that the Tapped Sleeves A5-05 do not touch the gears.

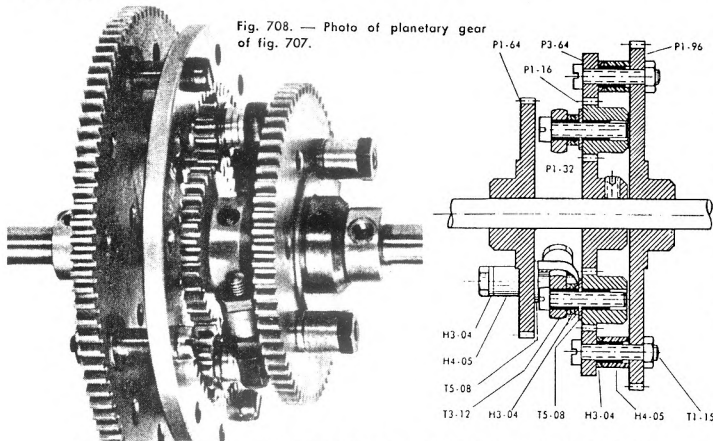
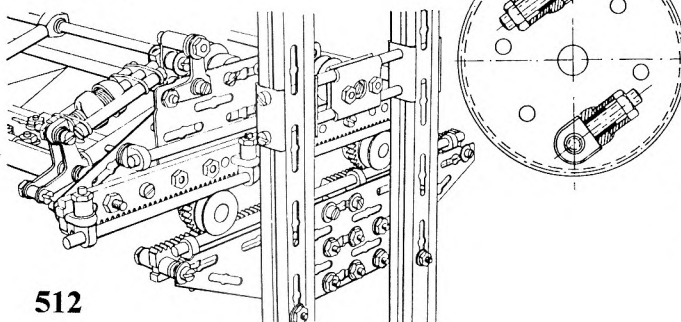


Fig. 708. — Photo of planetary gear of fig. 707.

Fig. 707. — This planetary gear is built with a sun gear P1-32, two satellites P1-16, and a ring gear P3-64. As the orbit of the satellite shafts does not coincide with the standard hole circle of the supporting gear — in this case a Spur Gear P1-64 — the shafts have been mounted in Eye Screws as shown on the right.

Fig. 613. — Detail showing guide mechanism in fig. 612.



**Sets** The 2 sets of the period, X1 & X2, are illustrated at the back of the manual. The X1 has about 2600 parts, weighs 13kg, and is packed in a wooden box 60\*39\*7½cm. The bottom is subdivided into small and large compartments, and above is a moulded plastic tray containing Plates and circular parts. The larger set has 4700 parts and weighs in at about 20kg; its box is similar but is 11cm deep with 3 layers: Plates, Beams, Axles, N&B, etc within wooden partitions in the bottom, 2 partitioned wooden trays for small parts above and on top a green formed plastic tray for all the circular parts. No detailed account of contents is available, and Colin's set isn't complete enough to provide an inventory. From photos it can be seen that the X1 doesn't have the 2 Slewing Rings, and the one each of the largest Gears and the Gear Ring, that are in the X2.

### FAC in 1964

#### The Major Changes

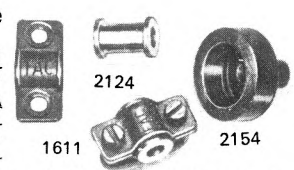
The most important of these was the redesign of the boss as shown opposite. Across both ends is a 2mm wide shallow groove which increases in depth towards the centre (I'll call it a grooved end). This allows the drive to pass from one boss to another with a Coupling Ring (#2410 below), like a double-sided dog clutch, in between. Alternatively the grooved ends can accommodate the ends of a pair of shallow, long U-shaped Keys, 2mm wide, that then run along inside the boss on opposite sides (as in Fig. 8), and these slide in the 2 grooves in a new 6mm 2410

Ø Grooved Shaft (#2040). Thus the parts can move axially, and movement is effected by a Gear Shift Fork which engages the 3.3mm wide circumferential groove now cut into the outside of the boss. A new Sliding Coupling (#2051 above) positioned between 2 parts with the new bosses, can be moved by the Shift Fork to engage either of them. (A similar part but without the dogs is called a Hub (#4000), and another Hub (#4001) is the same but is made of brass, has a 10mm Ø extension at one end, and is single tapped. I don't know what either are used for.) This whole system replaced the earlier 4mm Grooved Shaft and Sliding Dog, and was no doubt a significant improvement. I didn't try it in earnest because there were none of the U Keys in the set, but some DIY ones made of rather soft steel seemed to work quite well. Another change was that the Roll Pin was no longer listed & the pilot hole for them no longer provided.

The other radical step was to make all the Plates from aluminium instead of steel. They are more rigid with the smaller ones 2mm thick, and the larger 3mm. The Base Plate, now of 3mm aluminium, is no longer flanged and is smaller at 252\*168mm.

Several new Bearings were added. • A 4mm Bushing (#2124), 11mm long, held between a pair of new Clamps (#1611, right). • A Ball Bearing with a spherical outer race (to make it self-align I suppose), and 2 for 4mm Shafts, one of them to take axial loads. These last have a smaller o.d. (13mm) than the 6mm ones and are housed in a Bearing Cage (above). Its spigot can be held in the new Clamps, 1611, for example, or the whole Cage will fit into the standard Housing, retained by a Circular Clip.

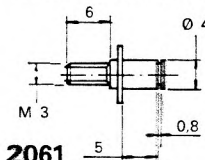
The range of Gears was greatly expanded with: • Addi-



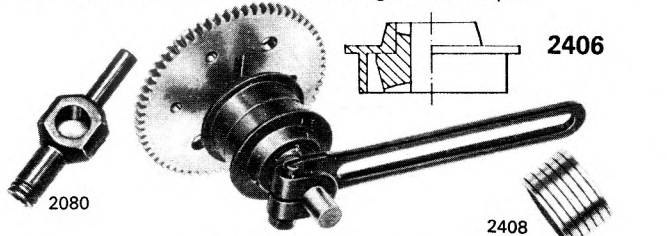
tional 20, 28, 36, 40, 44, 52, 56 & 72 tooth Spur Gears, and a 16t with a 6mm bore. • A pair of Spiral Gears (#3801, called Worms) to run at 14mm centres, with no boss but a single tapped hole through the teeth. • 2 extra Worm/Worm Wheel pairs with 5:1 & 10:1 ratios. All 3 pairs run at 21mm centres, and all the Worms have the single tapped hole instead of a boss. • Planet Gears for 4mm Shafts with 16 & 24 teeth, for use in epicyclic units. They are made of reinforced fabric, and are 3mm thick without a boss. • Roller Chain with a proper Spring Link, but no half link, and 3 new Sprockets for it with 10, 15 & 30 teeth. The pitch of the Chain is 1/4", against 4.5mm for the Ladder Chain. • Gears made of steel now have a BZP finish.

More Pulleys were added. The size of the 16mm/6mm bore one was increased to 26mm Ø, with bosses on each side just deep enough to take the 'dog' grooves. It was now steel, but the other 2 newcomers were aluminium, 66 & 132mm Ø, with standard bosses. The larger has 6x28mm lightening holes in its face. Another part that can be used as a Pulley is a 70mm o.d., steel Flywheel Ring which has the same diameter vee-groove as the 66mm Pulley, and 6 tapped holes which allows it to be bolted to the Perforated Wheel (described below), for instance.

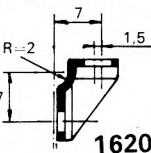
**New or Modified Gear Unit Parts** • The old Bush Wheel has 3 additional 4mm holes added (at 16.8mm radius) for use in epicyclic units, and is now called a Planet Wheel Disc. • For similar use, a 63mm Ø Perforated Wheel (rather like a Face Plate) with a ring of 6 holes, one of which is 6mm, and an outer ring of 12. • A short Stub Axle, #2061 left, which can be bolted onto either of the above to carry the Planet Gears: they are retained by a Clip in the grooved outer end. • A special Differential Centre (#2080 below) which can be used instead of a built-up unit based on the Shaft Head. • A Free Wheel Housing (#2406, below; o.d. 25mm). A RH or LH Expansion Spring fits inside a pair of these, face to face, or one can be used with an empty Bearing Box, to facilitate mounting, for example.



2061

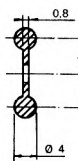


**New Structural Parts** • An Angular Coupling, #1620 - an angle bracket with triangular webs at the sides, and contoured outside faces to fit into the sides of Beams. It simplifies attaching Beams at right angles to each other, or to Plates. • M4 Studding in 500mm lengths with Nuts & Washers to suit. • 2 longer Threaded Rods (98 & 116mm). • 6mm Tubular Shafts in 7 shorter lengths from 35 to 146mm. Although these are called Shafts, and can be used as such, the emphasis is now on their use in structures, to act as a pillar around the 4mm Studding for example. These parts in Colin's set are black whereas the other Shafts are polished steel.

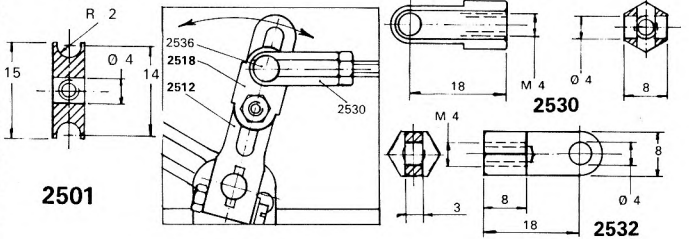
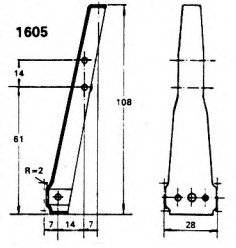


1620

**Other New or Modified Parts** • The illustration of the cross section of the Beam shows it solid rather than rolled. Has anyone a Beam from this time? • 6mm Shafts in 6 shorter lengths from 60 to 148mm. • A steel Shaft Sleeve, (Coupling), #2420, which serves to join 6mm, or with Split Sleeves, 4mm Shafts. It is 12mm Ø by 21mm long, with grooved ends, and is double-tapped at 90° at each end. • The Lead Screw now has 56mm of smooth 6mm Ø shaft at one end, and the End Bush Fitting is no longer listed. • The Cam Blank is replaced by a paper Cam Pattern and an aluminium Cam



Disc, 2.5mm thick. Both are 63mm Ø and the Pattern has radial as well as the 1mm spaced circular lines on it. • The Hand Wheel has been redesigned as a disc, still dished, with 4x15mm lightening holes in it. • A brass Sliding Cross Head (#2501 below), 18mm long, grooved to slide between 4mm Shafts at 14mm centres; it has a centre 4mm hole with M3 tappings out to the edges. • 4 Rocker [Crank] Arms (#2511-4) which clamp onto 6mm Shafts, and are pierced with one slot, 18 to 60mm long. One can be seen below with the Lock Plate #2518 bolted over the slot. The pivoting arm is held to it with a 4mm Connecting Pin, #2536, which is 10.2mm long with a 6mm Ø, flat round head, and the end of the shank grooved for a Clip. • Also below, a Fork Head, #2530, & a Tongue Head, #2532, both machined from 8mm A/F brass hex bar, drilled and tapped M4 at one end, and with a 4mm hole through the fork/tongue at the other. • A heavy, pressed, angled Support Leg (#1605 below), 11cm long, with the top on 3 sides shaped to fit into the sides of Beams. So it can be bolted inside a corner formed by 2 Beams. • 2 Rubber Rings, 11 & 35mm i.d. • A 65mm Ø unperforated Friction Disc with a 4mm deep flange, which pushes onto the Perforated Wheel. It is used in variable radius friction drives with the Rubber Rings. • 4mm Ø Plastic Cord in metre lengths. • Various Lock Washers.



**Other Discontinued Parts** • Beams with 11 to 19 slots, and the Beam End Plate. • The useful 4-hole Clamp that would hold a 4mm Rod against a flat surface. • The 43mm Half Pulley with 6 impressed spokes. • Slotted Grub Screws. • The very useful 2-Hole Link. • The Hook. • The Ratchet and Spring for it. • The 2 smaller Tyres.

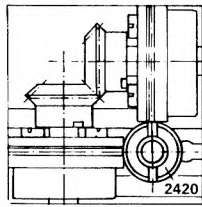
For some purposes there is no substitute for the Hook, Ratchet, and 2-Hole Link. When it can be used instead, the 3-Hole version of the latter looks untidy.

4 parts have been crossed out in the 1970 ink amendment to the 1965 UK Price List. These are the 500mm Grooved Shaft (leaving the 108mm as the longest), the Slewing Ring (now called a Centreless Wheel), the (remaining) Tyre, and the paper Cam Pattern.

**Prices** There are only a limited number of parts which can be fairly compared with MECCANO (MCO) prices, but it's interesting to try. Rods were 25% cheaper than MCO Axles but 4mm Shafts cost twice as much. Beams were about double the price of MCO A/Gs, and FAC Plates were 4 times dearer. FAC Nuts were nearly twice as much. The Slewing Ring cost 50% more than M143 but it was a more elaborate part. A comparable small FAC Gear was twice the price of an M26, and the equivalent of an M27a was nearly 4 times dearer. Most parts were considerably more expensive but not all: Ladder Chain was about half the price and so was FAC Studding.

**The Manual** It is now in 2 parts, PNs 0106 & 0107, with the same page size as before. #0107 contains pages 101-147, and after a brief but useful Introduction, and the names of the parts, all in Swedish, English, German & French, there are dimensioned drawings of all the parts as before. All the PNs are different. For some parts an additional drawing is added showing the part in a typical application: this is often very helpful but unfortunately some of the more obscure parts aren't shown in this way. And there

are a few of them that I simply gave up on, like the one opposite which shows the end view of the subject part, the Shaft Sleeve (Coupling #2420) mentioned earlier, but what use it's meant to illustrate I can't fathom.



The first part, the manual proper, runs to page 51 and is in English only. It is broken down into more sections than the earlier one and most give a better idea of the subject under discussion, with more drawings and specific comments, and sometimes a photo showing all the relevant parts needed for a particular type of mechanism - planetary gearing for instance. But it's still hard work trying to work out the function of many of the parts, and some aren't even mentioned. All that's included on a Differential is shown on the facing page, and all on one of the more comprehensively covered designs, on the back cover; the Extra MCS Sheets will include several other mechanisms including a Double Planetary Gear unit.

It is noticeable that more emphasis is given to mechanisms (particularly epicyclic units) and machinery, and the examples of realistic modelling have been reduced. The new thicker Plates are more often used in the frameworks for mechanisms than before.

**SETS** 3 sets are listed in the 1965 Price List, a Standard Kit, a Structural Kit, and a Gear Kit, with details of their contents. They were priced at £98, £66 & £114 respectively, and these were unchanged in the 1970 amendment, although a few of the quantities were varied, mostly reduced a little. By way of comparison a MECCANO No.10 rose from £50 to £80 over that period, but it isn't really possible to compare contents because the FAC sets contained large numbers of small parts like Retaining Washers, Spacers, etc, and at the other extreme some of the parts were in 500mm lengths. As an idea though, in terms of N+B, the 3 sets had 1050, 1750 & 645, against 1516 in the No.10, and 48, 0 & 93 toothed parts against 61.

A photo of what are probably these sets is shown in a leaflet, undated but certainly from this period. They are called the Standard, Industrial Kit I & II (with Moving, & Structural Parts), with 3023, 1998, & 4457 parts respectively. All are in wooden boxes, each of which has a neat lid that consists of the front, most of the top, and half the sides of the box (cut diagonally); it hinges back to form a shelf with a back and sides. The parts are in compartmentalised plastic trays, the smaller ones with hinged transparent lids. All the boxes are 61cm long and 19.5cm deep, with depths of 20, 20 & 13.5cm, and they weigh 14.5, 13 & 14kg.

## Some Comments

After a little experimenting with the parts I made two FAC models. The first was the little Crane shown for the Nr.1 Set in MCS, and the main thing it taught me was that the 12mm long, close tolerance Bushings held in Bushing Clamps, are not easy to align if the Shaft through them is to run entirely freely. If one follows the examples in the manual most bearings are clamped onto Rods, and this makes fine adjustment somewhat hit and miss. In the Crane, with easy access, all was eventually well, but in the next model I resorted in one case to having one end of the Shaft only half way through the bearing. Another hand-operated Shaft, which had to be 6mm for various reasons, would have been perfectly at home in a hole in a strip or bracket, but no suitable part with such a hole is included in the system. Another slight problem was adjusting a tapering framework to be completely symmetrical in all directions, and anything other than near perfection could make lining up bearings even more difficult. But I thought it an appealing model when it was finished.

What to make next. I thought about trying the 3-speed & reverse Gearbox shown earlier but I found that some of the small parts needed were missing from the set. It is I sup-

pose the equivalent of an all Pinion one I had made in the early 1970s from a design in the April 1969 MM (and which helped to convince me that MECCANO is the hobby): it is about the same size except that the MCO one is 2" wide against 3½" for the FAC, though that could be reduced by ½" without much difficulty. Also with the Shaft spacing it wouldn't be possible to use Ball Bearings, and using any of the brass bushed bearings would be difficult - in fact most of the Shafts run in the centre hole of the steel 3-Hole Link.

FAC obviously isn't intended for some of the types of model often made in MECCANO, so I thought that it would be interesting to try one based on a prewar Super Model, from before Flexible Plates were introduced. Given the parts in the set I decided on the original version of SML 11, the Single-Cylinder Horizontal Steam Engine, in part because the 136mm Pulley with a Slewing Ring bolted to either side, made a passable looking flywheel of about the same diameter as the Circular Girder used in the original.

I made the framework from Beams and Rods using as many of the different Clamps as possible and it turned out to be very rigid (and heavy). The only problem was that sometimes at corners the Clamps interfered with one another, but reasonable alternatives always presented themselves.

With the close tolerance parts I expected to be able to make a crankshaft that would run true, but despite several attempts a small wobble persisted. However the Ball Bearings used for the main bearings, though not the self-aligning type, had enough slop in them to accommodate the misalignment. They were quite difficult to line up though, but I've already mentioned that.

The cylinder was rolled from a Plate, and the valve chest made up, after much experimenting and not a little cussing, from a Plate, 2 Beams, and a number of Clamps. For this type of modelling FAC lacks suitable brackets and other small parts. As the crosshead a Sliding Cross Head worked perfectly running between 2 Rods. (There wasn't any 4mm Shaft in the set, but the Rods are quite straight over 6" or so) There is no FAC eccentric so I fitted Joy valve gear with the several linkages made entirely of Tie Rods, and they avoided it having a clumsy look. They were invaluable too for the arms of the governor.

The decking might have been made of Plates but their sizes weren't very suitable so I used a combination of Beams and flat Clamps which looked quite well, particularly with the handrails fitted, made again from those so useful Tie Rods.

Several motors are shown in the manuals but none are listed as being FAC. For this model a commercial 12v motor was hidden away in the base, driving the governor through 2 stages of reduction gearing, and then the crankshaft was back driven from the governor, through a pair of Bevels and a Pulley drive. The Gears all ran sweetly, as might be expected given their quality and the brass bearings used for the shafts. The other gearing underneath was a Worm drive from a hand wheel to change the valve gear setting. Although in theory there was plenty of room in the base it was actually quite difficult to fit in and adjust all the gearing and the bearings for it.

To FAC's credit the Engine ran smoothly, survived 5 outings, and a total running time which must amount to some 50 hours, without any problems, adjustments, or lubrication, after the initial setting up.

Apart from the difficulties already mentioned, the main problems arose from my unfamiliarity with the parts, and a tendency to try to find MECCANO solutions to FAC problems. That said, and although it became easier as I went along, I was never able to make even quite simple mechanical drives as compact as I hoped. In part this was perhaps a question of the natural scale for FAC with its basic pitch, in many cases, of 14mm against MECCANO's 12.7 - not much but it means that the volume increases by a third. This isn't of course a criticism of FAC because for

## DIFFERENTIAL WITH 3:1 RATIO BETWEEN GEARS

**FAC**

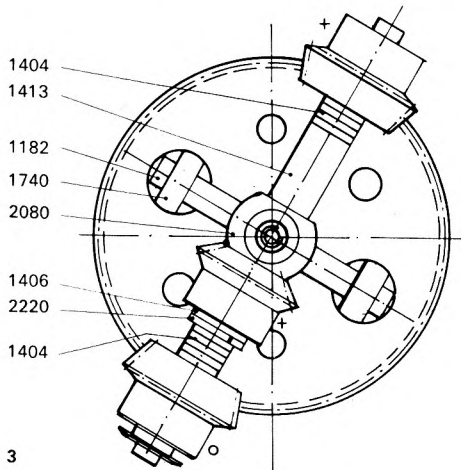
In the differential illustrated in Fig. 1-3, both differential gears are located on the same side of the centre, in which is journalled the shaft that continues the movement from one planet wheel to the other, giving a ratio of 3:1 between the differential gears; see also drawing, Fig. 2. The differential gears are indicated by A and C and the centre by B. Presuming A to be the drive gear, the movement is continued to bevel gear 3718 via shaft 1415, which is mounted on the extension of the 4-mm. differential centre stub axle formed by threaded rod 1102. Freely mounted on the same shaft, gear C is connected with bevel gear ring 3760, which constitutes the other differential gear. Planet wheels 3718 and 3720 are mounted on the diametrically opposed shaft, as illustrated, and the resultant ratio between the differential gears is thus 3:1. The differential centre is united with gear B.

Fig. 3 shows the planet wheel mounting. For increased balance and guidance, the other end of the planet wheel shaft is freely journalled in a bevel gear 3720. The construction is further illustrated by Fig. 2.

### Ratios

In the adjacent table o indicates locked gear and - reversed movement.

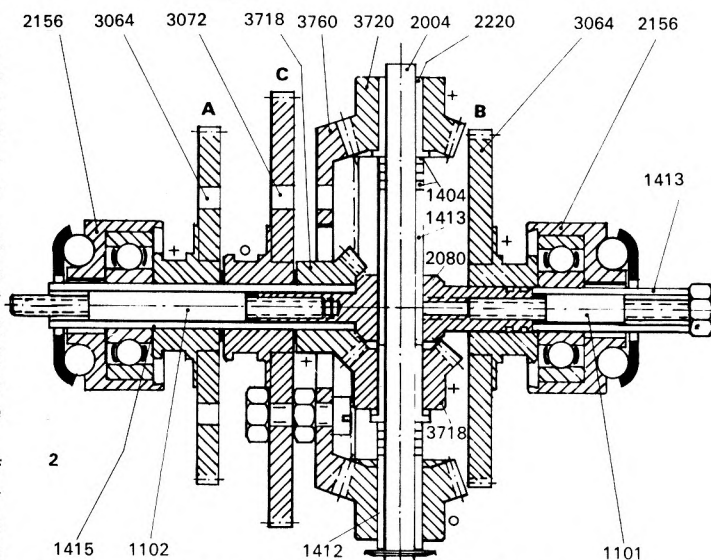
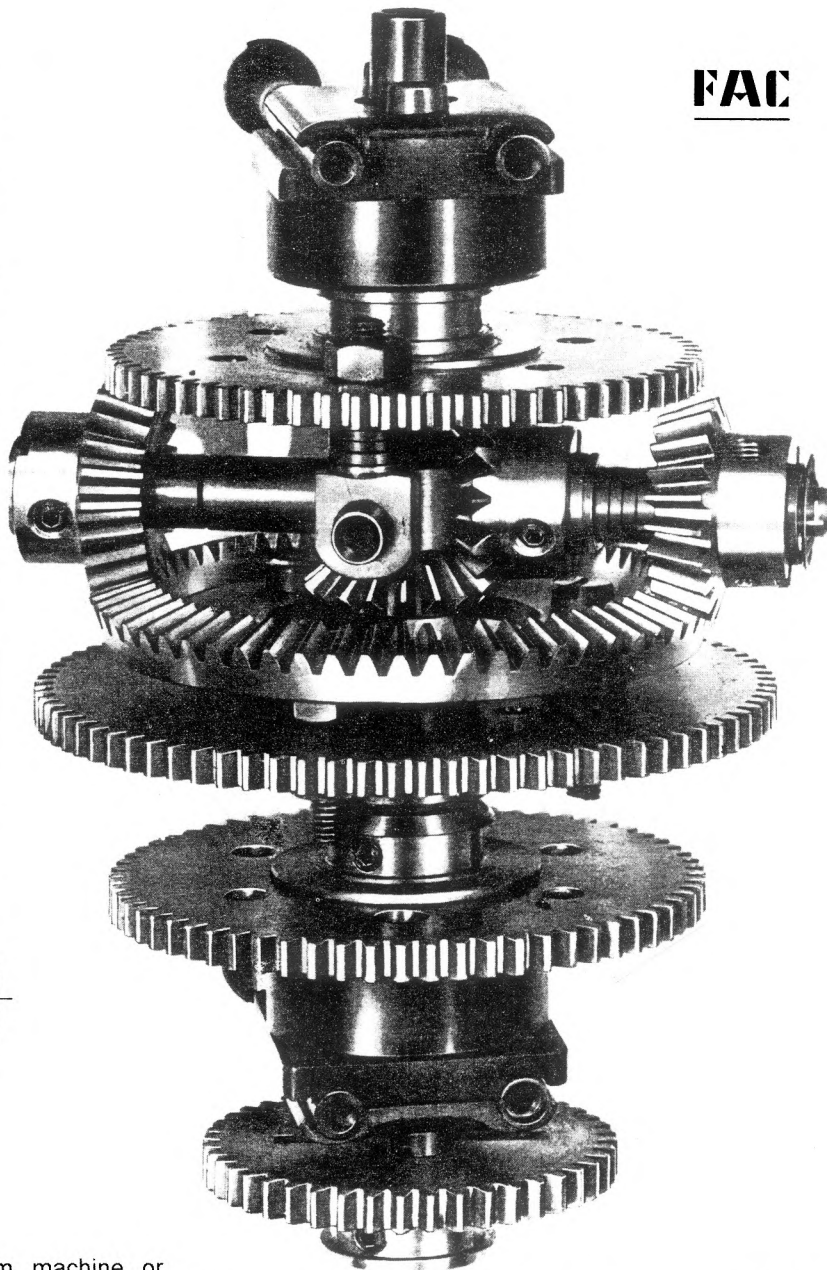
A	B	C
o	3	4
3	o	-1
4	1	o



its intended users, the size of a mechanism, machine, or model, wouldn't usually matter.

When Colin lent me his set he included some notes on his experience with it, and I deliberately didn't read these until I had finished making my models. He found it difficult to use FAC as he had hoped, to improve part of the mechanism in his MECCANO Rapier Loom, and he emphasised the space needed for the bearings, and the difficulty of lining them up. Another problem, that I found too, was in tightening some Nuts where the shape of the Clamps prevented the spanner getting a good purchase. He also made the point that although FAC models of particular subjects can be built, and look attractive, the system isn't suited to general purpose modelling, although an industrial user would benefit to an extent from a willingness to cut up or otherwise adapt the parts to suit his needs, and to use 'foreign' parts as necessary.

So how would an industrial user view FAC? The cost of the parts probably wouldn't matter at all in most cases. For small pieces of laboratory or workshop machinery I can imagine that someone experienced in using the system would find it easy to make substantial, rigid frameworks, and the Ball Bearings and 6mm Shafts would be very useful in providing what is often needed, a robust, reliable piece of equipment. Most machinery of this type is basically fairly simple, and it would be relatively easy to overcome any deficiencies inherent in the system. For demonstration models, mock-ups of prototype machinery, and experimental schemes, FAC would again have much to recommend it. The special parts for differentials and epicyclics would save



time, and the Grooved Shafts and sliding Gears would allow a wide range of gearbox and similar applications.

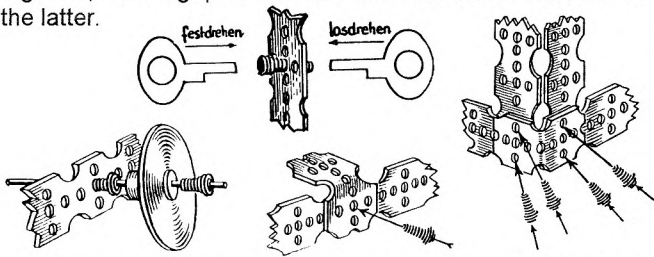
And even if all this, or even more, could be done with a 'toy' system, a major plus for FAC would be the accuracy of the parts. I well remember my disillusionment when I found that most of the A/Gs in my new 'toy' set weren't bent at anywhere near 90°, and I doubt if I'm the only modeller who has spent ages going through all his Couplings to find some which have their cross bores more or less at right angles.

**GERMAN SYSTEMS** Thomas Morzinck has kindly sent more information, as detailed below.

**AKRON** One or two details about this unusual, small German system were given in 15/412, and the shape of the Strips was shown in 17/476: Thomas has sent photocopies of a manual & a box lid, and a photo of a set. The lid is blue and measures about 6\*13½"; it has the name in a yellow panel, and shows 2 boys playing with a Windmill and a Wagon, both similar to models in the manual, and both needing 2 sets to make them. They are shown blue but all the parts are actually black.

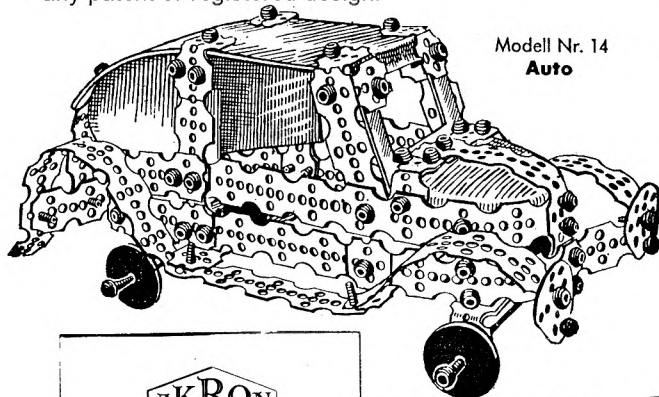
There was only one outfit and only 12 different parts in all. They aren't illustrated separately in the manual but can be seen in the model below and those on the front of this Issue. The set contained: • 6,10,10,6,4 Strips with 2,3, 5,10 & 17 segments. Given the 5mm hole pitch they would be about 15 or 16mm wide, and the longest 340mm overall. The holes look to be between 2½ & 3mm Ø. In the manual's intro much is made of the ease with which the Strips can be used for curved structures, due no doubt to their being made from thin springy steel. • 20 Angle Brackets made from 2 segment Strips. • 2 Wheel Discs of perhaps 25mm Ø, with inner and outer rings of 4 & 8 holes. • 4 Wheels of about the same size; they have bosses with Set Screws and are formed or flanged around the edge, or they might even have a pulley groove. • 2 each of 100 & 140mm Axles; bright and of very small diameter. • 85 Springs and a Key to insert and remove them.

As shown below, the Springs are used to hold the parts together, and to grip the Axles. Hence the small diameter of the latter.



The models, although small of course, are not simple tables and chairs, or other elementary constructions. The Digger and Crane are typical of the 15 models shown that can be made with a single set; and the Windmill is among the 5 that need 2 outfits. A further manual was promised with more models for 1 & 2 sets, and some that would need 3 or more. I can't say that the models look very attractive, but perhaps they would be better in the flesh. The necking in the Strips seems to have no particular purpose, though it would make changing the set of the Angle Brackets, necessary in some models, easier. Card, or similar, panels are shown in some models such as the Crane & the Car below.

Despite the novel method of fixing there is no mention of any patent or registered design.



**SUMMARY OF MANUAL** •Name: AKRON Stahl-Leichtbau-Kasten aus elastischem Material. •Details of maker: none. •No dates/ref nos. •Page size: 148\*106mm

deep. •No. of pages: 28 inc covers. •Language: German. •Printing: all B&W with line drgs of models. •No Illustrated Parts. •Page No. of Set Contents: 6 [no PNs]. •Sets covered: 1 or 2 of the only set. •No. of models for 1/2 sets: 15/5. •Name, Model No., Page No. of first & last model for 1/2 sets: 1: Flachwagen,1,7; Raddampfer,15,21. 2: Haus,16, 23; Waggon, 20,27. •Other notes: the printer's name & address, Wilhelm Müller jr, KG., Solingen-Ohligs, is given on the back cover.

**HOHA** Following on from 15/415 Thomas sent photos of Sets 1, 1a, & 4, and a copy of a manual from the No.4. I've also used a photo of parts in Frank Beadle's collection. The MCS models are all in the manual and the cover is identical too, but the typeface isn't always quite the same, so it isn't from the same printing. It lists the parts for most models but there's no list of all the parts, and no Set Contents. These aren't in MCS either so I'll try to identify the different parts and show the interesting ones as they appear in the models. The list won't be complete because parts are sometimes called by different names in different models, the same name is sometimes used for two parts, and inevitably the parts called up don't always agree with those shown in the model.

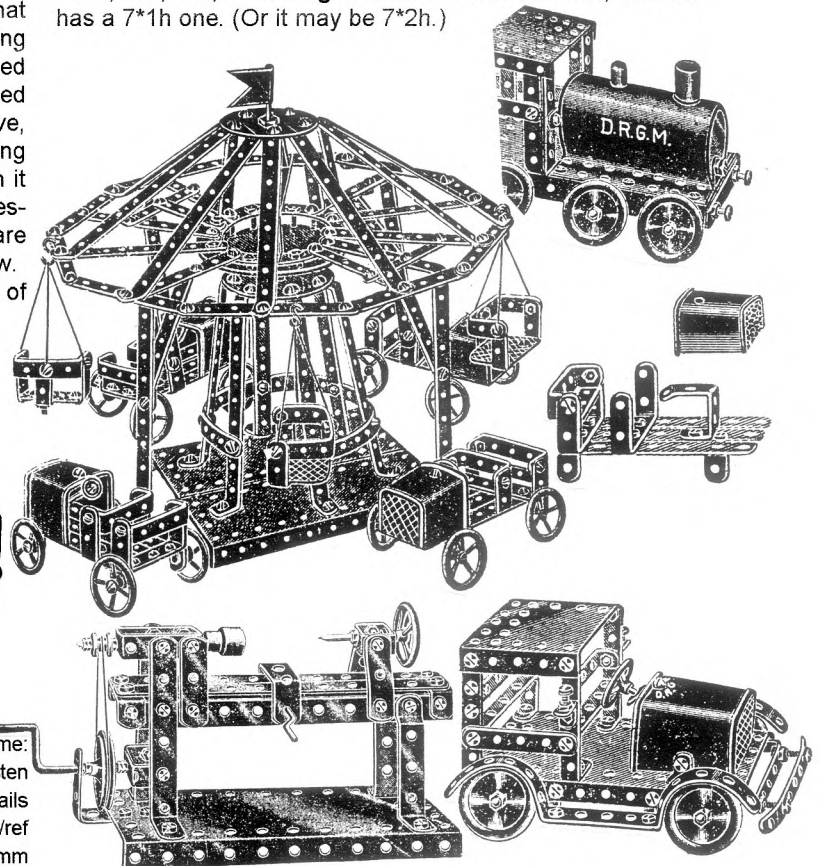
• **Strips** with 11,10,9,7,6,5,4,3,2 holes. The No.4 Set has some 23h Strips in it, but these are not used in any of the models. All have semi-radiused ends, & the ones in Frank's photo scale at about 12mm wide, or a little less. There are no slotted holes in the Strips or in any other parts.

A circular strip can be seen in the Roundabout below but the Parts List calls for 2 of the Large Circular Plates, and one of them could replace the circular strip. (There are several anomalies in this model.)

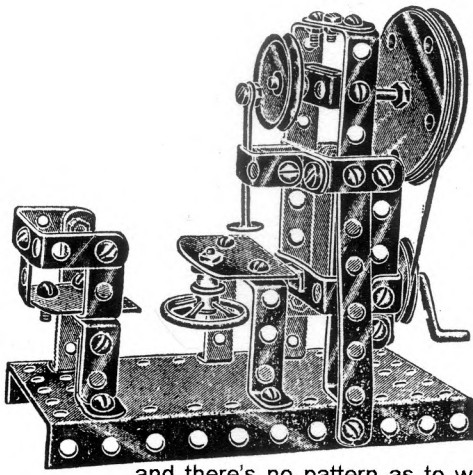
• As well as 1\*1\*1,1\*3\*1,1\*5\*1,1\*9\*1h,2\*3\*2 **DAS**, the 1\*5\*1 is shown with both lugs at 45°, and the 1\*9\*1 with 1 lug so.

• The 1\*9\*1 is also made as a **Reverse Angle Bracket** with 1 lug the other way, and also with that lug bent to only 45°. FB also has a 1\*1\*1 **RAB**. All the unusual DAS/RAB so far mentioned are separately identified in the Parts Lists, and were presumably supplied ready formed. In some models though, such as the Lathe below, ordinary Strips are called up for the 4 legs and the 3h Strips supporting the head and tailstock. Similarly for the mudguards of the Auto (below).

• 1\*1, 1\*2, 1\*3, 1\*4h **Angle Brackets** can be seen, and FB has a 7\*1h one. (Or it may be 7\*2h.)







• 4 **Pulleys** are used, one Loose and 3 with boss. Frank's scale at 13mm for the Loose, and 15, 25, & 50mm for the Fast ones. None have holes in their discs but in the manual the large one is sometimes shown with a ring of 5 holes, and the 25mm with one hole to allow an Eccentric Rod to be attached to it. These can be seen in the Press opposite.

• 4-Spoke & solid **Wheels** are shown on the Cars,

and there's no pattern as to which sort are fitted to which model throughout the manual, although the solid ones predominate. The No.1 Set has both types and the solid ones are the 25mm Pulleys fitted with black Rubber Rings. However Frank has one made of solid black rubber with a flat, conical centre. It is about 3cm Ø, rather smaller than the 4cm o.d. of the other Wheels. His 50mm Pulley is also fitted with a black rubber ring or tyre. On some models a Steering Wheel or Hand Wheel, as in the Lathe, is fitted.

• **Axles** are usually called Achsen and from the parts nutted to them, are either screwed rods or have threaded ends. Likewise the shaft of the Crank Handle. In a few models Wellen are called up as well as Achsen and perhaps these are smooth Rods.

• The 2 sizes of **Flanged Plates** described in OSN 15 are widely used in the models though sometimes the inner row of 5 holes at the end isn't shown in the manual models.

• Another plate is the flat **Seat** with 3 holes in it. Frank's one scales at 35\*28mm and has well rounded back corners. It can be seen in the Press.

• There are 2 sizes of **Circular Plate**, the smaller being about 50mm Ø with a ring of 5 holes near the outside, and the larger with 10 holes around the edge, plus one either side of the large centre hole. There are also a 50mm one with 10 holes, and a Large one 'mit Kugellager' - the last 3 varieties can be seen in the Merry-go-Round opposite. My dictionary has Kugellager meaning ball bearing, but here it seems to be the Large Pulley below the Large Circular Plate. It's in the No.4 Set & is some 90mm Ø, with a boss, and the holes either side of it that allow it to be bolted to the Plate

• **Special parts**. • A Car Bonnet with Radiator. It looks as if there are 2 sizes, one about 4h long which is usually fixed with an Angle Bracket at the bottom at each side, as in the Auto, and a smaller one, 3h long, shown in the No.0 models and in those on the Roundabout. It is bolted to the Steering Wheel Bracket as shown alongside the Roundabout. • A Loco Boiler with funnel and steam dome, that's shown to the right of the Roundabout. • A Cylinder (a pair under the Merry-go-

Round) for a Steam Engine, about 7h long and on a flat base similar to that of the Boiler, and a Piston Rod for it. • A Spindle (in the Lathe) and the Eccentric Rod in the Press.

• The Nose on the Bus below, which looks rather like the Boiler/Cylinder but appears to be 5h long.

• **Miscellaneous parts**. • Cheeseheaded Bolts, including some 20 & 25mm long, & hex Nuts. • The Screwdriver & Spanner shown by the Steam Engine, both about 8cm long. • A wire S-Hook some 20mm o/a. • A Collar. • Spring Cord.

Thomas wrote that HOHA parts are wonderfully finished, and Frank's live up to that description. All Frank's parts and those in the Sets are nickel plated.

The outfits mentioned in the manual are Nos.0,1,1a,2,3, & 4. The sizes of their boxes are given as: 20\*15\*3.5; 21\*15\*4.5; 21\*15\*6.5; 30\*21\*6; & 40\*28\*6.5cm for both 3 & 4.

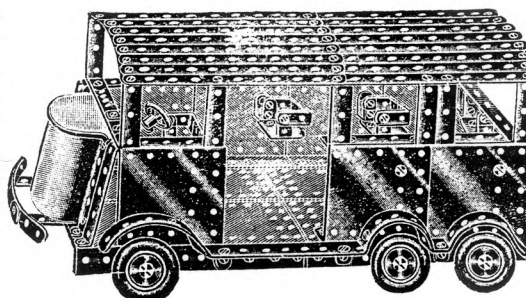
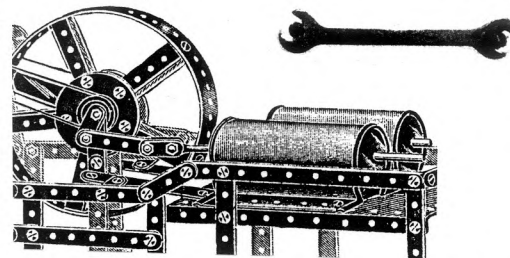
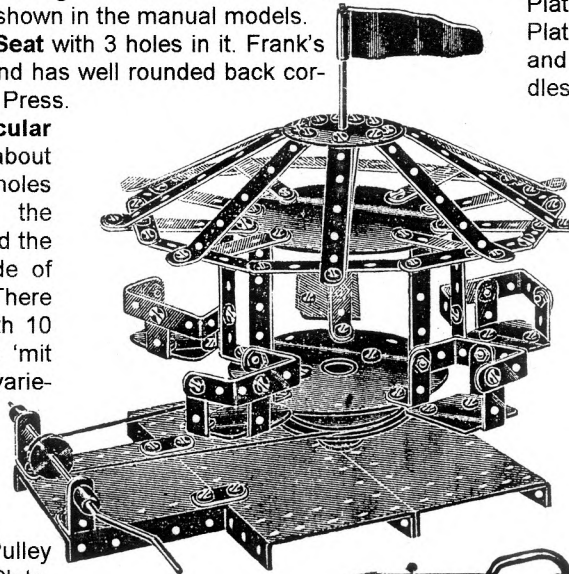
The parts in the No.0 models include a Small Flanged Plate, and a Bonnet/Radiator. No.1 has the larger Bonnet, a Steering Wheel, & a Large Flanged Plate. No.1a adds 1 each of the Flanged Plates, 1 Large & 2 Small Circular Plates, & the Loco Boiler. No.2 models are shown apart from those made from Sets 1 & 1a, and don't include any of the extra 1a parts except a Large Flanged and a Large Circular Plate. Above the No.2, the No.3 has 2 Large & 1 Small Flanged Plates, a Large Circular Plate with the Pulley under it, and 2 Small Circular Plates, one with 5 holes & one with 10. Also needed would be 5 Bonnets & 20 Spoked Wheels for the 5 Cars on the Roundabout, & the Bus Nose. The largest No.3 model, a Big Wheel, needs 220 N&B.

The No.4 doesn't follow on from the others and is a Machinery theme set for the Twin-Cylinder Steam Engine and machine tools. The main parts in the models are Flanged Plates, 3 Large & 1 Small, 2 Small Circular Plates, a Large Pulley, the Eccentric Pulley and Rod, 2 Cylinders & Piston Rods, 2 Spindles, and a Handwheel. The Steam Engine needs 120 N&B but the other models only up to 41.

No linking sets are known but in the manual accessory packs of Bolts, Nuts, Rubber Wheels, Pulleys, and other parts are mentioned.

There's no indication of date in the manual and the only sign of the maker is the initials R u H H on the cover. **SUMMARY OF MANUAL** •Name: Hoha METALL BAUKASTEN. •No details of maker. •No dates/ref nos. •Page size: 147\*210mm deep. •No. of pages: 28 inc covers, unnumbered. •Language: German. •Printing: the cover is as in MCS, in blue & red on light fawn; b&w. line drgs of models. •No Illustrated Parts/Set Contents. •Sets covered: 0,1,1+1a,2,3,2+3,4. •No. of models for each set: 6,9,5,3,2,6,8. •Name, Page No. of first/last model for each [no Model Nos.], 0: Handkarre,4; Sackkarre,5. 1: Rollfix,6; Kran,9. 1+1a: Windmühle,10; Kippauto,12. 2: Straßenbahn, 13; Großer Kran,14. 2+3: Flugzeug,26; Autobus,26. 3: Kinder-Karussell,15; Autokarussell für Hand- und Maschinenantrieb,21. 4: Doppelhammer, 22; Transmission,25. •Other notes: details from a photocopy; the printer's name & address, E. Horn & Sohn, Lüdenscheid, is given on p3; the inside front cover & both sides of the back cover are blank.

The No.1 Set is in a green box with the lid nearly covered by a label in shades of red, white & black, showing a boy working on a small Windmill with the Auto shown earlier alongside it. No manual is shown for either. The No.4 is in a black box and has a different label.



It's blue, red & black, and shows a boy reading a large booklet with **Hoha** on the front, and the Twin Cylinder Steam Engine on the back cover. The parts are housed in cells formed by card trays, in 2 layers over about ¾ of the area of the No.4.

**MECHANICUS** What follows is from a German manual, with the name **MECHANICUS** on the front, which shows the uses of the **MECHANICUS** Tool (see 12/321) and has illustrations of 11 models. The name **HELLER** (see 15/415) is not mentioned except that the steel strip supplied is referred to as **Heller-Stahlband**, and the A/G material as **Heller-Winkelstäbe**. And despite what was said in OSN 15 a set called **MECHANICUS-KASTEN** is mentioned, though what it contained isn't clear. The manual is thought to date from 1955 and its cover (below) certainly has a 1950s look to it. Note the second 'C' in the name, instead of a 'K' - was this a postwar fashion? (cf **MECANIC**, 15/415.)

The Illustrated Parts are shown on the back cover of the manual but the range is much smaller than that for **HELLER-MÉCANICUS** in MCS, and a few of the parts have different PNs. None of the Gears & Sprockets are listed, nor the Collar and Couplings, and of the Rods, only the 50 & 100mm lengths with threaded ends remain. Instead of the 3 diameters each of Pulleys, 6h Wheel Discs, & Circular Strips, there is one 40mm Pulley, and 2 Discs with a 3mm centre hole (25 & 40mm Ø). The 75mm Tyre is replaced by a 25mm one. Both the A/G & Strip are now only supplied nickel plated, and their maximum lengths are reduced to 50mm (that must mean centimetres) and 10m respectively. The A/G is still available in 3 sizes, with 6, 9, & 12mm wide flanges. A 70mm Screwdriver but no Spanner is listed. The N&B are said to be 3mm brass, and still come as 50 Bolts with 60 Nuts, though now in a clear plastic box.

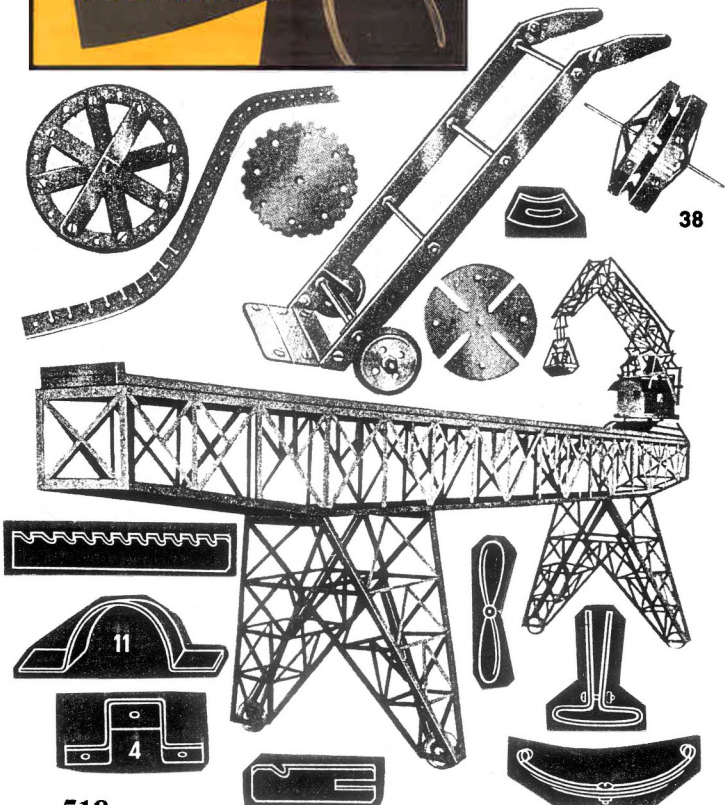
Including covers the manual has 12 pages. 208\*150mm, and the yellow & black cover is shown below. After notes about the Tool's 4 basic operations (cutting, bending,



Nr. 40 Sackkarren

Erforderliches Material:

- 1,35 m Stahlband
- 10 Stck. Schrauben
- 34 „ Muttern
- 2 „ Rollen Nr. 9/25 mm
- 4 „ Wellen Nr. 14/50 mm
- 1 „ Welle Nr. 14/100 mm



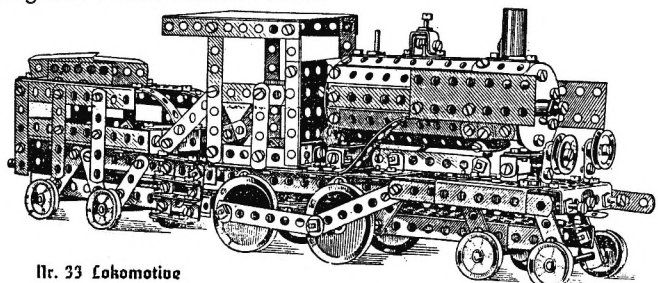
cutting, & punching a hole), 40 particular constructions are illustrated, and then there are photos of 11 models, with Parts Lists for the first 7. The first is the **Sackkarren**, Nr.40, and the last a large **Gantry & Grabbing Crane**. Both are shown in the previous column, with some of the constructions around them. No.38 is a fabricated **Pulley** that can be made in any required diameter. The other models include several that are in MCS, among them the **Low Table** with flower pots on it - the illustration is identical except that the plants (cacti) are different.

There is no maker's name or address in this manual, only a PR 'Vordr. Nr.74' on the back cover. The East German town of **Schmalkalden** is mentioned in the presumably postwar manual referred to in 13/360.

**MINIATUR** Thomas added (to 17/468) that the back cover of the manual is blank, and the covers are made from strong grey paper, like the early **STABIL** manuals. Also the parts in the early (1915) No.21 Set are of varying quality and their finish ranges from bad to adequate.

**ZICK-ZACK** This is about the later version, as shown in 15/420 and MCS, and the new information comes from copies of a manual (dated by its owner as 1948) and a box lid. The manual has models for Sets 1-4, and there are small photos of those sets, and also of 3 larger ones, S, SO, & L for **Spezial-, Sonder-, & Luxus-Ausführung** (Special, Super, Luxe Outfits).

The models contain some parts not mentioned in OSN 15: • 6,8,18h Strips. • 18h A/G (all the A/Gs have round holes in both flanges). • 3 Plates listed as 7h, 5h, & 2h gedreht. The 7h & 5h are probably 2 holes wide (see the smoke deflector in the Loco below), but I can't spot the 2h 'twisted' part. • 2 other sizes of Pulley, the largest some 50mm Ø with one hole in the face, and used as the driving wheels of the Loco. • A wire S shaped Hook is shown in several models but isn't listed. • 12 Windmühlenflügel are called up for 2 models but I can't spot them in either. • The 6h Disc noted in OSN 15 is probably only about 50mm o.d. with the holes on a pcd of 39mm. It also has a boss, and so might be called a **Bush Wheel**.



Nr. 33 Lokomotive

The size of the box for each set is given: Nos.1-4 are all 27\*20\*2.5cm; S & SO have 2 layers and are 31\*24\*4 & 41\*32\*4cm; L is in a 47\*35\*6cm plywood box with 3 layers and a hinged lid. As far as can be seen there are no new parts in the 3 largest sets. Each set has a different label on the lid, and each of the several that can be seen clearly has **KONSTRUKTIONEN BAUKASTEN** on it in large letters, and **ZICK-ZACK** much less prominently displayed. The copy of the lid is from the S outfit and shows an elaborate montage in black, browns & orange, with a boy playing with a **Tracked Crane** in the foreground, an engineer looking at a drawing in front of a furnace behind that, and in the distance a real crane and smoking factory chimneys. Curiously the model Crane is from the No.4 Set, and is so labelled.

The manual is about A5 size and as already mentioned, covers Sets 1-4. In the intro it is said that a shortage of paper prevents more models being shown, and that there is a Nr.2 manual which shows models for Sets 5 & 6, the only allusion to these sets. The models shown in OSN 15 are from the No.3 outfit and as would be expected those for the No.4 are larger and a little more complicated mechanically,

with the only vehicle, a Fire Engine, fitted with 'proper' steering. There's a realistic Treadle Sewing Machine, though it's not clear whether the 'needle' goes up and down, and a nice looking Bascule Bridge some 130cm long. It needs 38 A/Gs, 12 Plates, & over 100 Strips.

A whole page is used to feature a hand press tool called a ZICK-ZACK Kistenspann- und Verschuß-Apparate, but its purpose was to add metal reinforcing to wooden boxes and it has no connection with the constructional sets.

**SUMMARY OF MANUAL** •Name: Zick-Zack KONSTRUKTIONSBKASTEN. •Details of maker: none. •No dates/ref nos. •Page size: 140\*202mm deep. •No. of pages: 24 inc covers, of which 2-20 are

numbered and 20 is the back cover. •Language: German. •Printing: The cover is as MCS in yellow, blue, red, B&W. Line drgs of models. •No Illustrated Parts/Set Contents. •Sets covered: 1,2,3,4. •No. of models for each set: 9,9,7,8. •Name, Model No., Page No. of first & last model for each set: 1: Schubkarre,1,2; Hebekran,9,4. 2: Eisenbahnkran,10,5; Waage,18,8. 3: Missing; Exzenterpresse,25,13. 4: Hebekran,26,14; Lokomotive,33,19. •Other notes: details from photocopy with pp9-12 missing, so the No.2 models may extend beyond No.18; the printer's name & address, Müller & Co., Hagen (Westf.), is given on the unnumbered page with the Tool ad on it; probably the inside back cover; a large Big Wheel appears on the back cover (p20).

**MAKUMAL (Or Almost a Good Idea)**

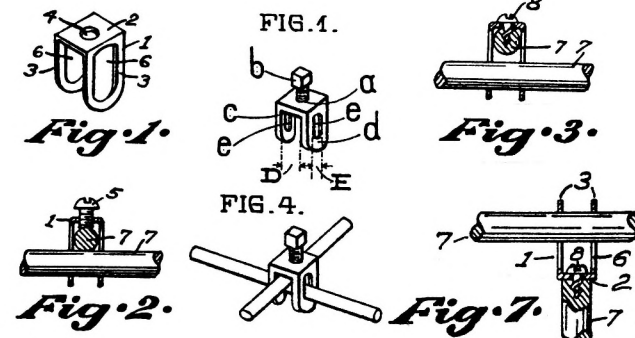
The name must be meant to be pronounced 'make 'em all', and it's a little American set in a tube, probably from the late 1920s. Richard Symonds kindly sent the photo opposite, with details and some sample parts. There are only 3 types of part, wooden 5/16" Ø Rods, metal U-Clamps to join them, and 1 1/4" wooden Pulleys called Wheels. It's similar in many ways to the French all-metal MOBILLO of a decade earlier, though, as explained later, there was a novel claim in the MAKUMAL patent, even if it was never put into practice. My thanks to David Hobson for digging out the relevant patents.



The UK MAKUMAL patent, No.305830, was in the name of an American, Walter Rogers Benjamin of 2223 Missouri Avenue, Granite City, Madison County, Illinois, U.S.A. The Application Date was Feb.20,1928 and it was accepted on Feb.14, 1929. No Convention date is given; 'Pat March 6 1928' is printed on the MAKUMAL label, no doubt the date of the U.S. patent.

The method of joining the rods is shown in Figs.1 & 2 below, left, while in the centre are Figs.1 & 4 from the 1918 MOBILLO patent. But Benjamin's claim related to Fig.3 where one rod is held to the top of the clamp by a wood-screw, thus allowing the bottom rod to rotate freely in the clamp. An alternative method of leaving a rod free in the clamp is shown in Fig.7, with the woodscrew going into the end of the rod. 2 models are shown (Figs.5,6 opposite), and the use of woodscrews 8 allow freedom for the swing, and for the wheelbarrow's axle. But there seems no means of preventing the axle in Fig.6 from moving sideways.

Another claim was to have slightly different diameter rods 'permitting a wheel to be mounted loosely or tightly on a rod'. In Fig.5 wheel 9 is stated to be tight on the axle 17.



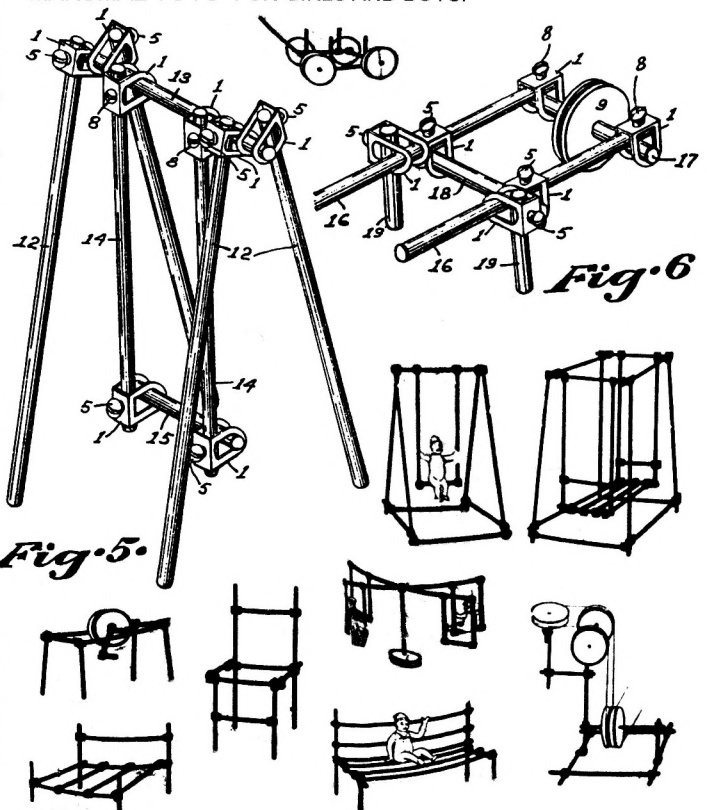
The 7 lengths of Rod are 1,2,3,4 6,8,10", and they are dyed green. The Wheels are plain discs, perhaps 1/4" thick, with a pulley groove, dyed red. The Clamp is bent up from steel .035" thick, with a dull, pale green look. It is nearly 7/8" long by 9/16" wide, with 3/8" between the arms of the U, and 1 1/16" by 1 1/32" slots. The tapping is 8-32 and the Set Screw is steel, possibly nickel plated, with a round head, .29" Ø and 7/32" u/h.

Woodscrews aren't listed among the Contents, nor were there any in the set, nor any sign that any of the Rods had ever housed one. So it looks as if the idea of having one Rod free in a Clamp was not pursued, no doubt because in practice it was too difficult to put in the woodscrews. However if so I don't see how some of the models on the tube work, the Swing below for example.

None of the Wheels are now tight on any of the Rods but possible shrinkage over the years makes it hard to be sure that that was always the case. In fact if Rods couldn't be free in the Clamps, much of the need for Wheels to be tight on the Rods disappears. No means of retaining loose Wheels on Rods is shown but a Clamp on the outer end of a Rod would provide a simple, if ugly, way of doing so. One starts to wonder if the models were thought out before the impracticability of the claims in the Patent was realised.

The other models on the Tube include simple furniture, 3- and 4-Wheel Vehicles, a 4-Seat Roundabout, and a Pulley Drive through 90°. A selection is shown below, around the models in the Patent.

One good thing about the system is the slogan: MAKUMAL TOYS FOR GIRLS AND BOYS.



Before looking at the claims I'll describe the set and the parts. The packaging is a card tube, 3" Ø by 12" long, completely covered by a label, and with a screw-on metal top. The label is red and black on yellow, and on it are the contents, 20 Clamps, 64 Rods, & 8 Wheels; 17 models, and the maker, Makumal Toy Co., Granite City, Ill(inois), U.S.A.

**ENGINEERO - The DANDY BUIDER** Limited details of this small American system are included in MCS but now Richard Symonds has kindly sent a photo of all the parts, an actual Strip, 1" Pulley, & a N&B, and a copy of a manual. And I find I have 3 other Strips that came from I don't know where. This system is known from around 1915, and is unique in having diamond shaped holes in most parts, with vee notches in the edges of all the strip parts and of the A/G, as can be seen below. Certain similarities with MASTER BUILDER were pointed out in 16/451.

**PARTS** The range of parts is identical to that of M B at the time of the 'Monroe' manual (see 16/450), except that ENG had no Pawl, Pinion, or 3" Axle. Notes on the 36 ENG parts follow. My Strips have a very dark grey metallic finish and except as noted, all Richard's parts are the same: no doubt the tin plating mentioned in MCS, darkened with age.

• **DATA** (in mm) **STRIP** (11-hole): •hole pitch/size, 12.7/4.3 square; •width, 12.7; •thickness, .8; •ends have chamfered corners. **BOSS**: •brass, •o.d. 8.7, •i.d. 4.27, •single-tapped .098" Øx40tpi. **THREAD**: .145" Øx32tpi. **AXLE DIA**: 3.96. **DP (Mod)**: N/A. **NUT**: sq 6.5 A/F; **BOLT**: roundhead 7.6 Ø; both nicked steel.

- A 25h **A/G** which is in effect 2 Strips joined at 90°.
- 4,5,6,7,11,17,25h **Strips**.
- 4\*5 & 5\*11h **Flanged Plates** with flanges on the long sides. An 8h long Flanged Sector Plate with a centre row of holes, the wide end straight, and the narrow one concave.
- 4½ & 5½" **Crank Handles** with a small hole through.
- 2,3½,4½,5½" **Axle Rods**.
- An **Angle Bracket** with the V nicks at the bend but a round hole in one lug and a slotted hole in the other.
- **Single & Double Bent Strips**, bent up from the appropriate length of Strip.
- A **Bush Wheel** with 8 round holes, about 1½" Ø. • A brass looking **Wheel Disc** of about 1" Ø, with 4 round holes at ¾" radius.
- A 1" brass plated **Pulley** with a tiny RH Set Screw in a neat boss that only protrudes ¾". A similar Pulley without Boss (called a Wheel) is shown below (#24), with a photo of the part under it. In both Pulleys the rims of the 2 discs are formed parallel to each other outside the V, rather like many ERECTOR 1½" Pulleys.
- A bright 14t **Sprocket** of about 1" Ø, and Sprocket Chain.
- A **Nut** 2.8mm thick, and a **Bolt** 7mm u/h. The thread definitely isn't the usual 8-32, see above: was there ever a 7-32 size? The **Set Screw** also has a smaller than usual non-standard thread.
- A brass looking **Collar**. • A **Spring Clip**. • A bright, flat

looking **Hook** (#29 below). • A RH **Woodscrew**, about ⅝" u/h. • A hank of dark looking **Cord**.

• A double-ended **Spanner**, about 3½" o/a, which may have been painted black. • A flat, curvy **Screwdriver**, 3¾" long, stamped ENGINEERO. Both are shown below.

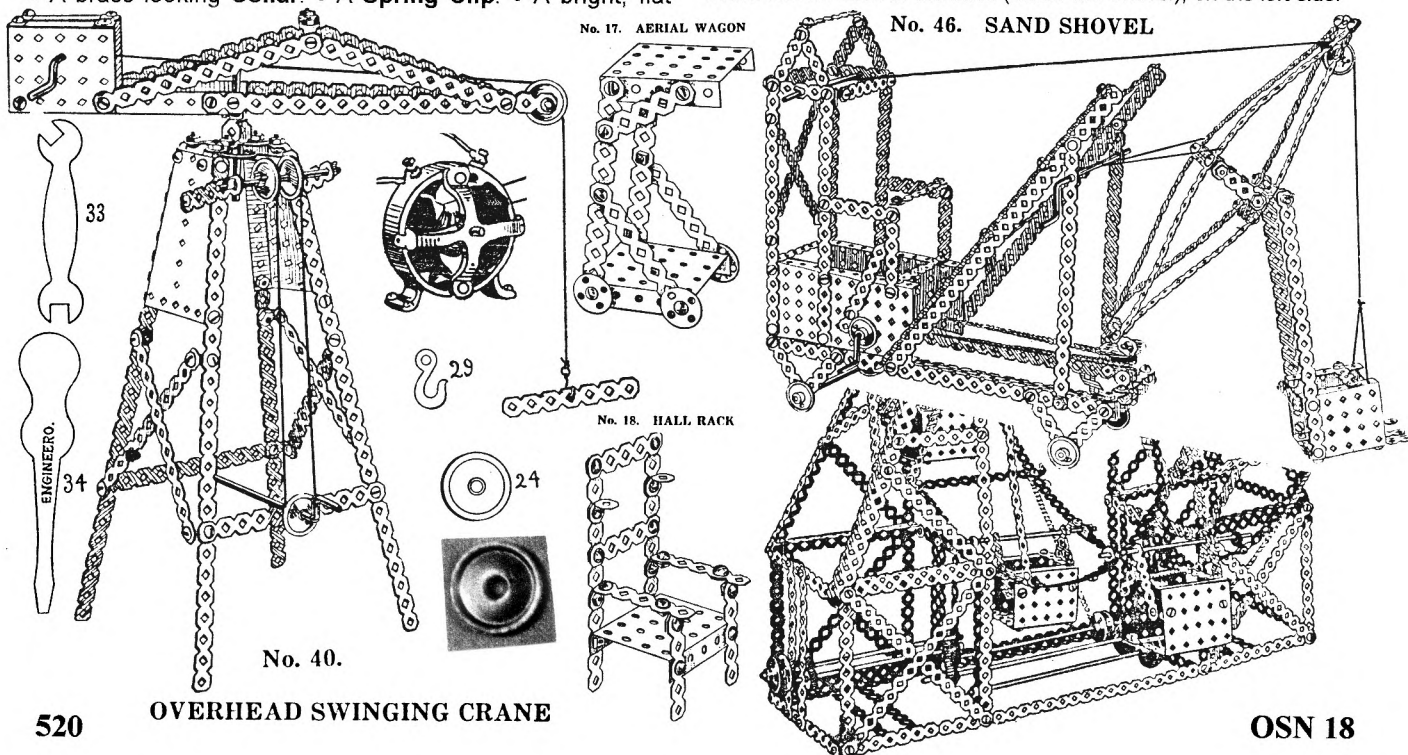
The first 11 parts in the ENG and M B Parts Lists have the same PNs, and nearly all have exactly the same name. One or two in both systems are unusual, such as Spanner Wrench, and Washer (for the Wheel Disc), though the ENG name is 'Washer, Wheel'. Some parts in the 2 systems look similar, in particular the Wheel Disc, and the Spanner (note that the Monroe part didn't have a centre hole).

The holes in the Flanged Plates in the models in MCS, certainly those in the small ones on p5, are round, not diamond shaped. And in the Manual the first 20 models, all those for Set 25, show the 4\*5h Flanged Plate, the only one used, with round holes (as in the Hall Rack & Aerial Wagon below). All the Plates in later models have diamonds with a couple of exceptions - there are round holes in the 5\*11h Plate in the Crib, No.27, and in the Sector Plate of the No.34 Bridge (also shown in MCS), although the holes in the rectangular Plates in that model are diamonds. Those last two might have been oversights but all the No.25 models...? It must be a possibility that all the Plates had round holes originally. Another anomaly in the Hall Rack is that the free holes in the Angle Brackets are diamonds.

**SETS** MCS shows 7 main sets, Nos.10,25,50,100,200,300,500, priced at that number of cents, ie from 10c to \$5; and 4 linking sets, 25A,50A,100A,200A. This manual contains models for Sets 25 through 300, though they are usually referred to by price, from 25c to \$3. The only mention of Set 10 is in the Set Contents, and a \$5 set is mentioned in the introduction, along with a linking set 300a.

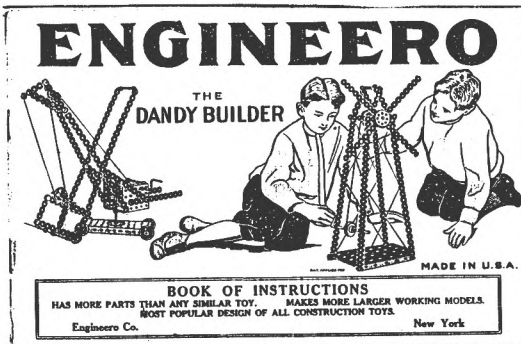
The contents of the ENG and M B Sets 10 & 25 are identical: thereafter they diverge somewhat, particularly in the matter of Strips, N&B, and Axles, with ENG 300/M B 3 having 135/80 Strips, 150/125 N&B, and 4/10 Axles.

**MODELS** The 20 page manual contains a fair selection of 50 models including all those in MCS. On paper at least the notches don't improve the look of many of them. Apart from the holes & notches, a few of the smaller ones are the same as M B models, & a good handful of others are near relatives. On the whole though they are perhaps slightly more imaginative. The Crane below is one of the better ones, & the Sand Shovel can be compared with the MODELIT version in 8/187. One model is shown driven by the motor below, under the Crane jib, but no reference is made to it. A 25" Ø Ferris Wheel on the back cover (without title or comment), has a Chain drive around the rim. I think that 2 pairs of reduction Gears can be seen in the base (under the Shovel), on the left side.



**HISTORY** The earliest known date is from the Jan 16, 1916 G&T, which in its American N/L describes ENGINEERO as a cheap and popular metal construction toy of U.S. manufacture which is selling well. The address of Engineero Co. is given in the Manual as 369 Broadway, New York City, and the 'Factory' as Keystone Mfg. Co., Newark, N.J. - & I also have a note that the original manufacturer was Haber Bros. Inc., of New York City, who sold to Keystone in 1917. None of these companies or addresses tie up with anything so far known of M B, and it isn't clear who was copying who. Quite possibly each was watching the other very carefully. There is 'PAT. APPLIED FOR' on the cover of the Manual, and a date for that would be of interest.

G&T also says that ENGINEERO is also known as the 'dandy builder'. I thought that might mean that sets were sold under the 2 names, but as can be seen, both names are on the manual cover, & so perhaps that's what G&T had in mind. But if anyone has



material under just the DANDY BUILDER name, do let me know.

**SUMMARY OF MANUAL** •Name: ENGINEERO/THE DANDY BUILDER •Details of maker: Engineero Co., 369 Broadway, New York City. Factory: Keystone Mfg. Co., Newark, N.J. •No dates/ref nos. •Page size: 255\*170mm deep. •No. of pages: 20+ covers. •Language: English. •Printing: B&W cover & line drgs of models. •Page No. of Ill Parts & highest PN: 19,36. •Page No. of Set Contents & highest PN: 20/38.

•Sets covered: 25,50,100,200,300. •No. of models for each set: 20, 8,10,7,5. •Name, Model No., Page No. of first & last model of each set: 25: TABOURETTE,1,3; LIBRARY TABLE,20,6. 50: TOWER WAGON,21, 6; RAILROAD SIGNAL,28,9. 100: SWING,29,9; REVOLVING DERRICK,38,12. 200: AEROPLANE,39,13; FLYING MACHINE,45,16. 300: SAND SHOVEL,46, 16; RAILWAY SIGNAL,50, 18. •Other notes: sets sizes, inc #10, are given in the Set Contents but the models are related to the price of the sets.

### More Small ERECTOR Sets

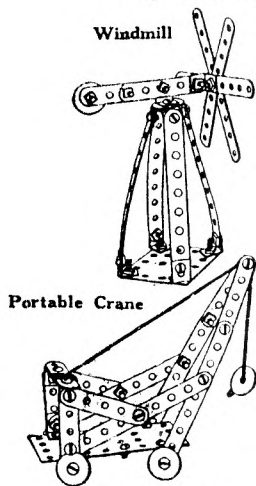
**An Erector Set** David Hobson has kindly lent me a set which has in it the M 973 Leaflet that was mentioned in 8/197 & 15/410. The box measures 7 1/2\*5 1/8\*8 5/8" and the blue & red lid is similar to the #4 Set one on p74 of *Greenberg*, with a man, & 2 boys working on a large Bridge. The main differences are that there's a toy train on this Bridge and no set number on the diagonal stripe in the bottom left corner. No indication of set size is given on the box or the Leaflet. The corner of a similar lid can be seen in the illustration of the No.0 Outfit in 15/411. On the bottom right corner of this lid is the reference M850, and the address: The A.C.Gilbert Co., New Haven, Conn., U.S.A.

Apart from some missing N&B the Set appears to be complete with most of the parts held to a 'flanged' cream card by pressed out tabs and slots. The N&B & Angle Brackets are in a 1 1/2" Ø plain brown cardboard pill box. All the parts are nickel plated and comprise a 5\*4h Plate, 6x5h & 2x9h 1/2" wide Strips, 6 Discs 7/8" Ø, and 6 Angle Brackets. All are made of thin steel, .52mm thick except the .59mm Plate, and the holes are 4.4mm Ø except those in the Discs & 5h Strips, which are 4.5mm. The ends of the Strips are not quite fully radiused (6.8mm) and some burr can be felt around their edges though it isn't sharp. There were probably 12 N&B - the Bolts have the normal round heads, and the Nuts are the post-1924 1/4" A/F size.

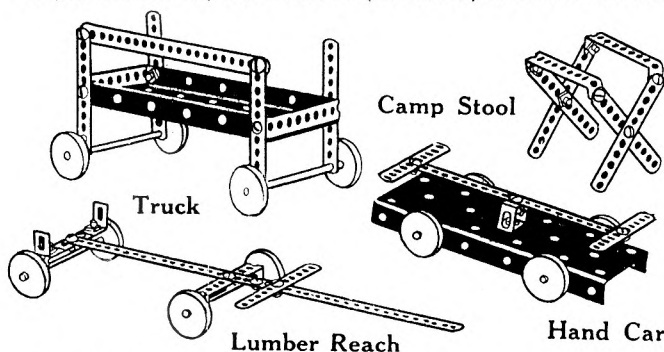
From the models in the Leaflet, 2 rather than 6 Discs might have been expected. Another oddity is that 4 of the 6 Angle Brackets are the pre-1924 1/2" wide type, while the others are the later ones, 13/32" across.

The Leaflet is a single sheet folded in 2 with pages 7\*5". The address on the front is as the lid but without the U.S.A., & 10 models are shown on each of the other pages, for 1,2 & 3 of the Sets respectively. Many of the 1 Set ones are among those in 3/46, and two 3 Set ones are shown opposite.

There is no positive indication of date but the last Patent date on the lid (for Austria) is Jan. 25, 1924. The old style Angle Brackets, if they were in the Set originally, might indicate a date near 1924. The design on the lid was changed for the regular small sets in 1928 but if the ad containing the No.0 shown in OSN 15 was accurate, it may have been used for the very small sets well after that.



**A No.000 Erector** The other find is a single page torn from a manual. On one side are 17 'Models Built with No.000 Erector', with inset in a central box, 6 more 'Models Built with 2 No.000 Sets'. The main parts in the Set (see the models below) are a Flanged Plate, #FO, 4x11h Strips, H, 2x21h Strips, I, 2 DAS, FQ (an 11h Strip bent across holes 2



OSN 18

& 10), at least 3 Angle Brackets, 4 push-on Wheels (probably wood), & 2 Axles. The Strips all have the 1/4" spaced holes and all are standard parts, unlike some of those in the 1929 No.0 described in 15/410.

Most of the models are different to those in the 1929 No.0 Leaflet, though a few are of similar design but with Strips replacing the Girders.

On the reverse are small illustrations of 6 large 'Wonderful Models Built With The New Erector', and I found a similar page in a © 1926 manual, though it was probably used over many years. That is the only clue as to date except that Parts FO and FQ were listed from 1928.

### The FANTASIE 'R' Patent?

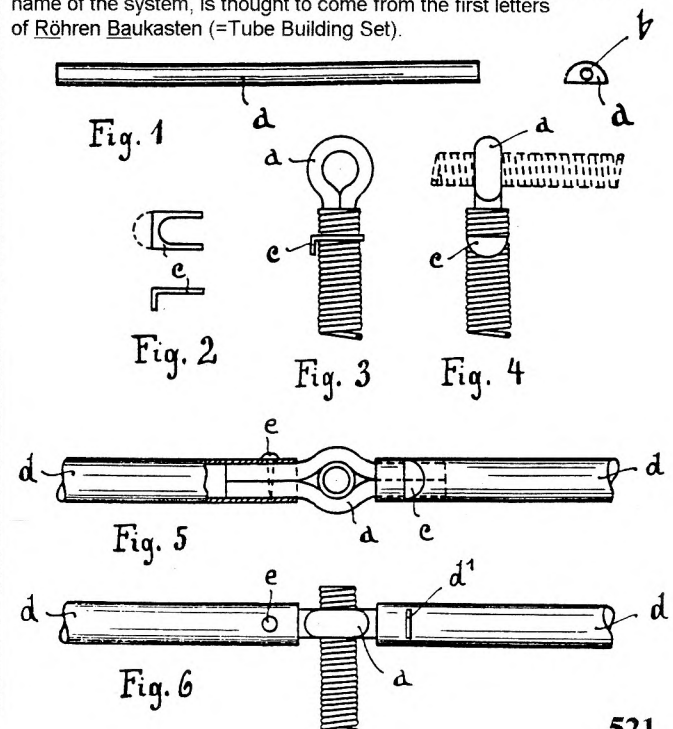
This German system was mentioned in 15/413 and David Hobson has kindly sent a copy of the UK Patent 383107, which may show the method used to join the Tubes together. It is headed 'Flexible Connecting Elements for Screwless Metal Toy Building Elements', and is in the name of Jobst Fleischmann of 25 Bielingstrasse, Nuremberg; the application date was Jan.14, 1932.

The idea was that a length of semi-circular section rubber, reinforced by a flexible wire running through it (Fig.1) could be wrapped round a tube, or a wire spiral, and the ends pushed into a similar tube at right angles, to hold the two together (Figs3/4). Alternatively two lengths could be used to join 3 tubes as shown in Figs.5/6.

If spirals were used the joint could, if necessary, be locked by pushing a sheet metal clamping fork (Fig.2) into the rubber between the coils of the spiral, as at 'c' in Figs.3/4. With tubes (Figs.5/6) the fork could pass through slots d' on either side, or a pointed pin, e, could be pushed into the rubber through a hole in the tube.

So was this the method used in FANTASIE 'R'? The date and use of tubes & rubber connectors all sound right, but was the method described in the Patent really practical? Let's hope that one day some FANTASIE parts will turn up.

Incidentally I didn't mention in OSN 15 that ROBA, the alternative name of the system, is thought to come from the first letters of *Röhren Baukasten* (=Tube Building Set).



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## ITEMS FROM LETTERS

1. From Kendrick Bisset: A photo of a **JUNIOR MECHANIC** No.101 Set (see 13/361), courtesy of George Wetzel. The lid is similar to the that of the 201 described in 12/327, but the 6 models on it are different. The packaging and parts, including Strips with chamfered corners, look the same as those of the 201. The Set appears to be complete and the main parts are 2,4,6 of 16,8,4h Strips; 6 Angle Brackets; 4 Wheels; 2 & 1 of the 2h & 8h long Flanged Plates; and 1 Crank Handle. The interesting thing is that there's a manual with the Set. It covers both the 101 & 201 sets and the cover (opposite) scales at 8 $\frac{3}{4}$ " wide. The top half is blue with white lettering; the bottom half is white with Manual of Instructions and the maker's name and address in blue.



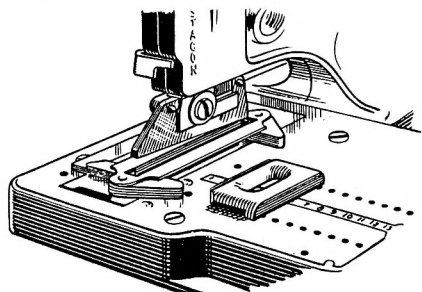
2. From David Hobson. • The **GILBERT NEW WHEEL TOY** was available in Britain well before 1921 (see 13/360): it is the subject of full page Gilbert ads in the Dec. 1919 and March 1920 Boys' Own Paper. [3 sets were mentioned, at £1.19.6, £3.7.6, & £5.5.0. The middle outfit had 'gears and pinions', and the largest 'also makes a small sleigh and racer with runners'. The model left, one of 3 shown, isn't in the manual summarised in 8/199. Both ads contained a coupon which was to be sent to Mr. A. C. Gilbert

(Dept.27), 125, High Holborn, London, W.C.1.]

• The **MANUFAX** Sets 0-4 were advertised (by B&T) before the Sept.1932 date given in 7/155. They are in an Oct.1931 BOP ad at the prices given in OSN 7. It's odd because this ad predates the Dec.1931 Supplement ad which lists only the Nos.1 & 2 outfits.

• A Nov.1956 ad from Claude Rye Ltd. (in the Children's Newspaper) probably marks the end of **JUNEERO** in the UK. It offers Sets 0, 1A & 2A at less than half price, with a further reduction for large quantities. No doubt the manufacturer's stock was being sold off. **JUNEERO** was on sale in Holland in 1962, see 14/395.

• An article in the October 1920 *The Toyshop & Fancy Goods Journal* advises that the **PRIMUS** Motor Chassis Outfit, and an Electric Motor for use with the standard sets, would be available before Xmas. **PRIMUS** vertical Steam Engines to drive models are also mentioned.



cut the 1/2, 1, & 2" Strips into any length from 3/4 to 12".

• A system called **DORFAN**, or **DURFAN**, was in an MCS lists of possibles: nothing definite is known of a normal constructional set of that name but in *The Toy Trader* of April 1927 there's an ad for a constructional electric railway engine called the **DORFAN** Loco-BUILDER. From the illustration, the motor and gearing had to be assembled and fitted to a body made up of 2 pressed sides joined together. The name on the box is The Dorfman Co., Newark, NJ, and there's NYC 51 on the sides of the loco.

• In the July 1921 issue of *The Toyshop & Fancy Goods Journal*, a review of the range sold by the toy factor Bedington, Liddiatt & Co. included **PYFYLY** (see 14/365) as a new constructional toy.

Some of the 30 or so relevant trade marks shown in *Toys & Automata Marks & Labels* by Gwen White, are of interest, and for each a name and date (of registration presumably) are given.

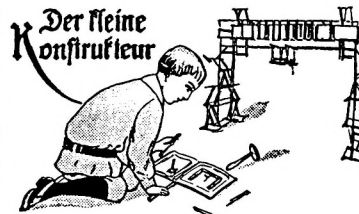
• For **BANGAROO** (see 9/235) they are Alfred James Bartlett of Gloucester, and 1908 (although a later entry shows 1922). The toy is described as 'detached pieces to join together'.

• The 1900 mark to the right belonged to **Bernhard Karl Emil Scheer**, tinsmith, of Burgstädt, and was for 'metal toys to take to pieces' (Zerlegbare Metallspielbaukästen).

• For **STRUCTO** the name is Thompson Manufacturing Co, Freeport, Ill. & the date, 1912.

• The illustration opposite is that of **DER KLEINE KONSTRUKTEUR**, by Hermann Tietz of Berlin, in 1913. No indication is given of the material used. The name was used again in the 1950s, see 12/313.

• **HAPPYNAK** (4/72 & later in MCS) is from The Matchless Metal Polish Co, Old Swan, Liverpool in 1915 - not the name in MCS but both were at Old Swan.



3. Richard Symonds sent a photo of a **CONSTRUCT-O-CRAFT** Model 100 set, which is packed in a tube with a screw top, 3 $\frac{1}{8}$ "  $\varnothing$  by 9 $\frac{5}{8}$ " long. The main point of interest is the 'Manufactured exclusively by Hedge Tool & Mfg. Co.' on the tube. The only address is Chicago, which is also that of the Boxar Tool & Mfg. Co., the maker given in MCS. Hedge came after Boxar because a Boxar manual, like the one the MCS material came from, is © 1946, and this tube carries © 1948 HT&MC. The photo of the boy and model shown on the tube is identical to the one on the Boxar manual. There was no manual in the tube; the few remaining parts in it are the same as those in a #500 Boxar set. Were the two companies one and the same with just a change of name? In case anyone wants a starting point, Boxar's full address in the manual is 2240 W. Ogden Ave., Chicago 12.

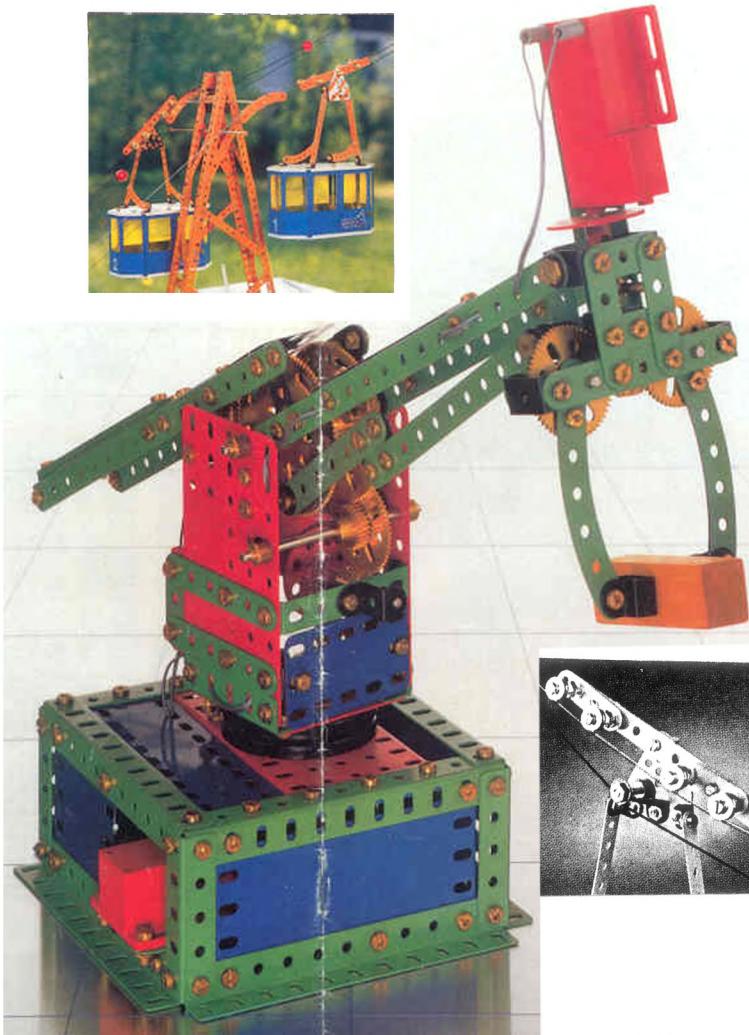
4. Thomas Morzinck wrote that **abs** metal construction sets are being made in The Czech Republic for the German company **Ebert & Schön** of Munich, and are sold only by the firm Manufactum, of Marl (near Essen). A leaflet gives a few details - the parts are said to be 50% larger than those of comparable outfits, and all metal ones are nickeled. 8 small sets are available, each making one simple model - a Windmill, Carousel, Biplane, Cross Country Car, Fire Engine, Big Wheel, Tractor & Trailer, and Timber Lorry. The latter is over 70cm long with Road Wheels that look in proportion. A larger outfit with 228 parts makes a nice looking Wind Turbine, apparently driven by clockwork. There's a blurry photo, that won't reproduce, of each model. The address given for further information is Handelskontor Ebert, Aidenbacher Strasse 108, 81379 München, phone/fax 089 788111/788118. This sounds as if its the same as the E.B.S. mentioned in 17/491.

5. Roger Baker sent a photo of an unused No.3 **MAC ET NICK** set. The lid is covered by a colourful picture of a man & a boy behind a large model Submarine, with a Crane in the background. The 'blueprint' with the set (in French) looks about the same size as the one described in OSN 17 but is in portrait format, and the 10 models on it are different with a Monoplane top right and a Warship bottom left.

6. From Michael Grace: • 'On the **MÄRKLIN Robot** Set from a few years ago, I found it rather 'fiddly' to make up - some of the clearances were tight and there was a good deal of play in the various movements. Overall it was a bit

disappointing for a set that cost so much, though it does contain 4 motors (albeit 6v).'

• 'I also have the **Cable Car Set** and it makes up into a very attractive model that works quite well, and follows real practice in some respects, with steel cable, well articulated pulleys that move nicely over the saddle on the intermediate tower, etc.' [The Robot Set, #1007 was mentioned in 2/16, and the Cable Car, #1057, from the mid-1980s, in 10/266. In neither case was there an illustration but the ones below



will give an idea. The Car is made from special parts, and the body is shown blue with a white roof, and yellow tinted

windows; all the Strips and Girders are orange.

7. From Don Redmond. • The **EZY-BILT** Contrate is distinctive with a very rounded edge ( $\frac{1}{8}$ " rad.) and the teeth actually cut into the curvature. It is nickel with a brass boss.

• On **DÖCO** (15/413), it was displayed in a 1920 Canadian Centre for Architecture exhibition at Montréal, and the catalogue describes it as 'a wood and metal system; split-pin rivet assembly; includes design book; box 10.5\*37\*24.9cm; parts: bars 24.7\*0.8cm, clamps 0.8cm, discs 6.8cm; punch press 8\*34.3\*13.9cm.'

• The **STRUCTO** Worm (see 15/424) is a rather crude looking item of the same alloy (zinc?) as the Gears, and with noticeable flash and mold marks. The teeth look rather chewed but it has probably had much use.

• In a mixed lot, a yellow plastic Wheel, with a square-section rubber Tire, 1.5" o.d., marked **BILDIT**. That's a new name but was it a constructional system? The bore appears to have been drilled out to about  $\frac{3}{16}$ ".

8. From Jeannot Buteux. • The French patent for **SPEDICON** (see 17/470) is No.923760, and it was granted in 1947.

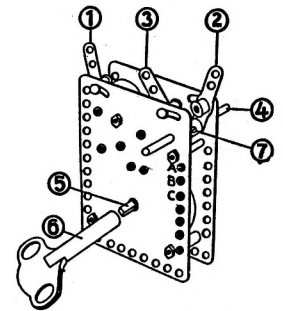
• **MAC et NICK** (17/472) was also patented, by a M.Cosneau in 1948, No.936145. [No equivalent UK patent is known.]

• Manuals in French have turned up for **STRUCTATOR** and **KLIPTIKO**.

• A **PYGMÉE** (16/448) set has been found for the first time: it's in a metal box and includes a complete manual.

9. Following the notes on the **MÄRKLIN** Chassis in 17/482, Josep Bernal sent a photocopy of a 4-page Leaflet in French (Refs: Ta 07 33 m & F. M446) showing the parts in the Nr.1105L **Motor Truck Body** Set, and how to assemble them onto the Chassis. The details of the parts have been included in an Extra MCS Sheet.

10. Thomas Keel sent a photocopy of the Instruction Leaflet, in German, for the **MIGNON C/W Motor** Nr. 250 (right), which was described in 10/262. The holes A,B,C in the side-plates allow a 12t Pinion on the output shaft, 4, to mesh with the other 3 Gears in the system, or their positions can be reversed for higher speeds.



Nr. 1 = Schnell- und Langsamgang  
Nr. 2 = Abstellhebel  
Nr. 3 = Vor- und Rückwärtsgang  
Nr. 4 = Arbeitswelle  
Nr. 5 = Aufzugsachse  
Nr. 6 = Aufzugschüssel  
Nr. 7 = Arbeitswellenrad mit Gewindestift.

**EXTRA MCS SHEETS** The Sheets listed here are available at 15p per Sheet plus postage. That makes £4.65 for all 31 Sheets.

MCS Amendments, List No.6 [1]  
AKRON: X1.1,2/6,5,5a [2]

ENGINEERO: X1.2,4,5,6 [2]

E.Z.: X1.1,2,4,5 [2]

FAC: X1.1, [1]

FAC [a]: X1.3/4,3a/4a,5 [2]

FAC [b]: X1.6,6a [1]

FAC [c]: X1.2,3,4-4I,5-5b,5c/6,6a,6b [9]

INSTRUCTO: X1.1,2,4,5 [2]

KONSTUKTOR [10]: X1.1,2,4,5 [2]

KONSTUKTOR-MEKHANIKA [2]: X1.1,4/6,4a/6a/7,5 [2]

KONSTUKTOR SHKOL'NIK: X1.1,2,4/6,4a/6a,5 [3]

MAKUMAL: X1.1,5 [1]

MÄRKLIN: X2.3a/4b,5 [1]

**ACCOUNTS** Dear Subscriber,

Your remittance of \_\_\_\_\_ received with thanks.

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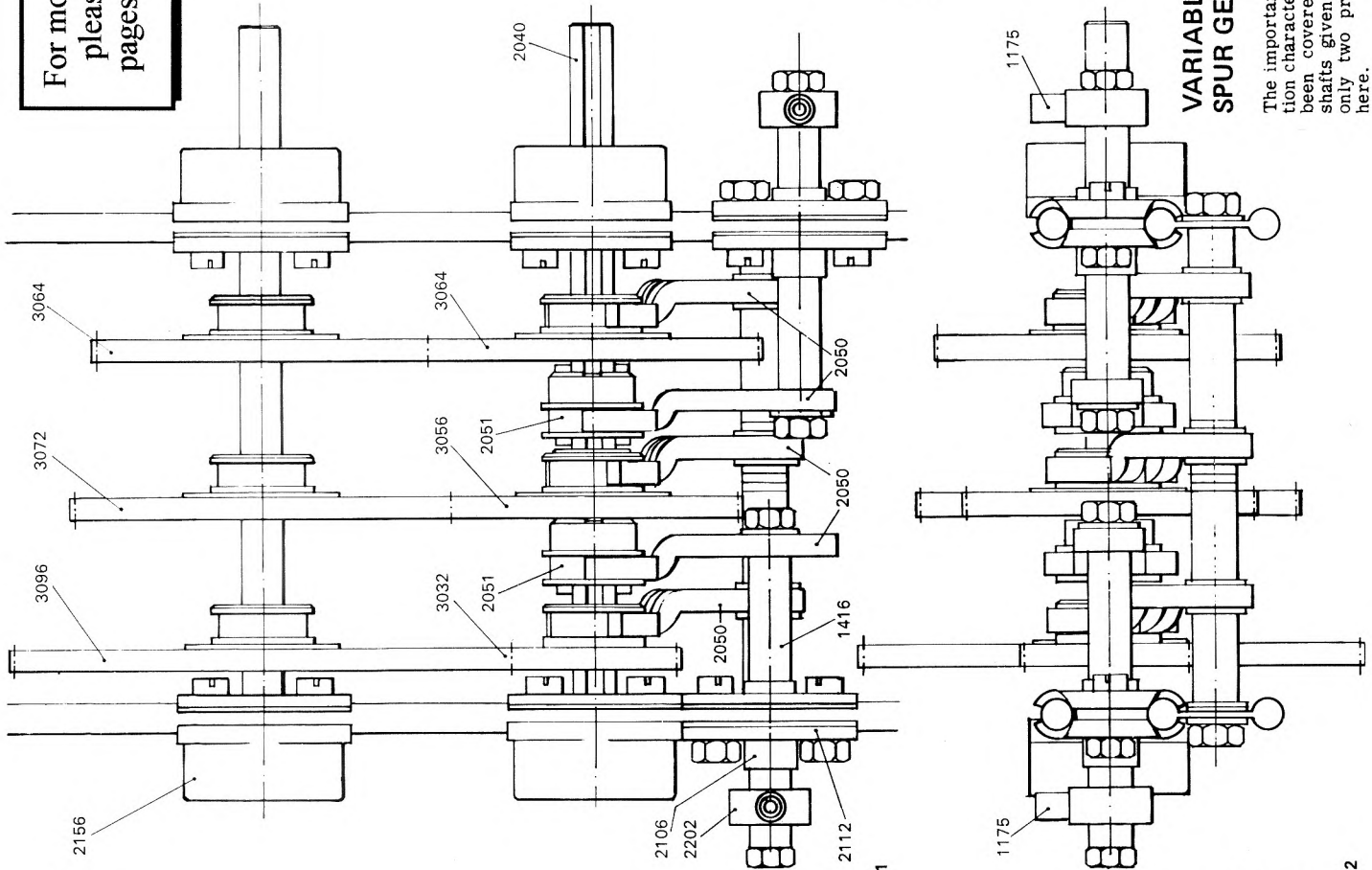
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pages 508-515.



**FAC**

### VARIABLE RATIOS BETWEEN SPUR GEARS

The important points as regards the construction characteristics of gear boxes have already been covered in the description of hubs and shafts given under "Fac standards", page 5; only two principal types will be illustrated here.

Gear box, constant mesh.  
This type of gear box is most effective in operation, since it permits ratios to be changed whilst engaged. Two drawings of this type of unit are shown in Fig. 1 and 2. The driving spur gears 3032, 3056 and 3064 are mounted in bearings on the driving grooved shaft 2040 and located axially by gear shift fork 2050. Between these gears, sliding couplings 2051, with keys 2041 attached, are held in position by gear shift forks. The sliding couplings are engaged with the grooves of the hub, and the shaft movement is thus continued to the driving gears.

