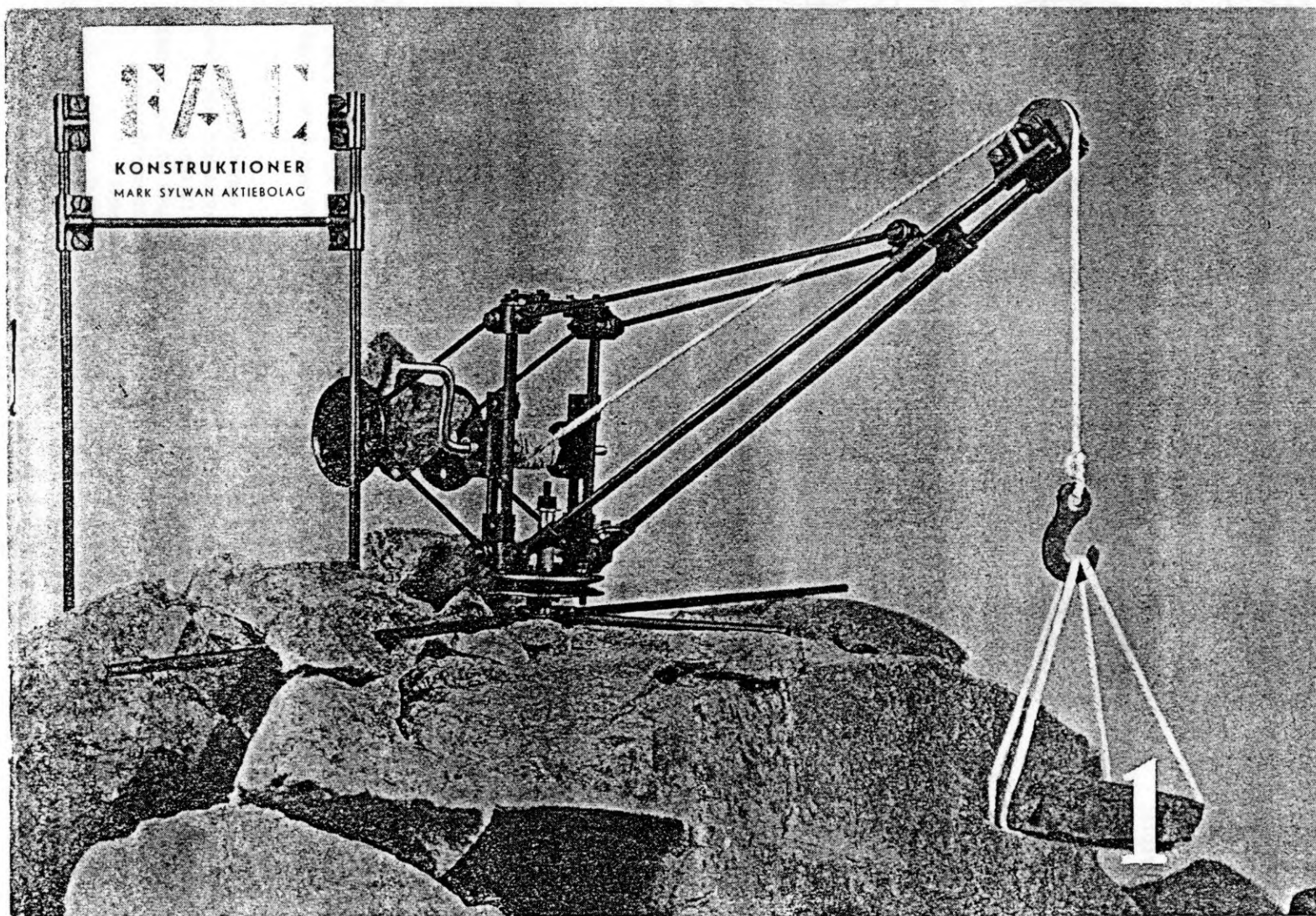


NAME	FAC {NOTE. 3 phases of FAC can be distinguished and are denoted by the labels [a], [b], & [c]}.
TYPE	Mechanical Engineering (mainly for industrial use).
HOLE DIAMETER	3.1 and 4.1mm.
	HOLE SPACING 7.0mm is basic spacing but 14.0mm is more common.
SETS IN SYSTEM	[a] 'Toy' outfits KONSTRUKTIONER Nr 1 & 2. It is not known if there were sets for industrial users at this time. [b] X1 and X2. [c] A Standard Kit, a Structural Kit, and a Gear Kit.
DIFFERENT PARTS	[a] 112. [b] 158. [c] 211.
COLOUR	Most parts black metallic. A few, including most Gears, plain steel, but BZP in Phase [c]. Plain aluminium Plates in Phase [c].
FIXING METHOD	Rods and Beams are usually clamped together, but Plates separated by Threaded Rods are also used. - M3 & M4
MOTORS	Although motors are shown in manual models, none are listed.
PERIOD	[a] 1952 to at least 1953. [b] From 1957 or before, to 1964 or shortly before. [c] Known in 1964, to the present
MANUFACTURER	[a] Mark Sylwan AB, Hornsgatan 89, Stockholm Sv. (known in 1953 & 1959) [b] Transitoria Trading Company AB, Gjörrwellsgatan 15, Stockholm K. (known in 1964) [c] FAC Systems AB, Floravägen 6, S-80228 Gävle (known in 1975).
COMMENTS	A wide selection of precision parts. The range of parts was extended between Phases [a] & [b], and again in about 1964, when many existing parts were also redesigned. The existing pages show the Phase [b] system. The new pages FAC[c]: X1.6-6b are from a List dated Jan. 1965, & the manuscript changes to it were marked as being 'valid from 1/1/70'. The original 'Qty per Pkt' has now been added to the left of that column, & the original 'Contents' in the first (Part No.) column. All the new 'X1.3, 4, & 6' material has been reduced to about half its original area.
OTHER SYSTEMS NEWSLETTER	18/508, 18/524, 19/526, 24/712, 40/1197, 41/1235

MATERIAL SUPPLIED BY Bruce Baxter, Chris Freeman, David Hobson, Colin Reid, & Geoff. Wright.

Note: This Set I was introduced in 1952 - this is the Manual front cover.



Mark Sylwan Aktiebolag

Hornsgatan 89 · Stockholm Sv

Telefon 44 10 85, 44 10 95 · Postgiro 459 443



1. Kopplingsplåtar

	Detalj nr	Antal pr förp.	Pris pr förp.	Pris pr st.	Beställas		Kv.	
					Antal förp.	Antal st.		
	Överfallsplåt	1/01	50	4: —	0: 10			
	Sadelpåt	1/02	50	4: 50	0: 12			
	Korsplåt	1/03	50	4: 50	0: 12			
	T-plåt	1/04	50	5: —	0: 14			
	Innervinkel	1/05	50	6: —	0: 16			
	Yttervinkel	1/06	50	8: —	0: 18			
	Enkel klammer	1/07	50	4: —	0: 10			
	Dubbel klammer	1/08	50	4: 50	0: 12			
	Bandhylsa	1/09	50	10: —	0: 25			
	Ändhylsa	1/10	50	10: —	0: 25			
	Skarvhylsa	1/11	50	12: —	0: 30			
	Enkel lagerplåt	1/20	50	6: 50	0: 16			
	Dubbel lagerplåt	1/21	50	7: —	0: 17			

8. Skruv, mutter, brickor m. m.

	Detalj nr	Antal pr förp.	Pris pr förp.	Pris pr st.	Beställas		Kv.	
					Antal förp.	Antal st.		
	Skruv med ostskalle M 3x6 mm	8/01	100	2: 70	0: 04			
	Skruv med ostskalle M 3x8 mm	8/02	100	2: 90	0: 04			
	Skruv med ostskalle M 3x12 mm	8/03	100	3: —	0: 04			
	Skruv med ostskalle M 3x19 mm	8/04	100	3: 60	0: 05			
	Stoppskruv PSS M 3x5 mm	8/08	100	3: 60	0: 05			
	Mutter M 3x6x2 mm	8/10	100	1: 95	0: 03			
	Bricka 8x3,2x0,8 mm	8/20	100	1: 80	0: 02			
	Öglebult M 3x12 mm	8/31	25	6: 75	0: 30			
	Muff, invändig gängning M 3x4x5,2 mm	8/40	50	3: 80	0: 09			
	Muff, invändig gängning M 3x4x12,2 mm	8/41	50	5: 60	0: 13			

9. Övrigt

	Detalj nr	Antal pr förp.	Pris pr förp.	Pris pr st.	Beställas		Kv.	
					Antal förp.	Antal st.		
	Vev, längd 10 cm	9/01	10	1: 75	0: 20			
	Krok	9/02	10	1: 30	0: 15			
	Gummiring, 42 mm, passande till linhjulplåt 5/01	9/10	1	0: 55	0: 55			
	Gummiring 54 mm id. 104 mm yd, passande till rälshjulplåt nr 5/20	9/11	1	3: 20	3: 20			
	Spiralfjäder, slipad 10x15 mm	9/30	10	5: —	0: 55			
	Snöre	9/40	25	5: 65	0: 25			
	Instruktionsbok till FAC Nr 1	9/20	1	1: 50	1: 50			
	Instruktionsbok till FAC Nr 2	9/21	1	2: 25	2: 25			

2. Stavar och axlar

Stavar 4 mm Ø

längd	18 mm	2/01	25	1: 50	0: 08				
» 30 »		2/02	25	1: 75	0: 10				
» 40 »		2/03	25	1: 75	0: 10				
» 50 »		2/04	25	2: —	0: 12				
» 60 »		2/05	25	2: 20	0: 12				
» 70 »		2/06	25	2: 40	0: 13				
» 78 »		2/07	25	2: 50	0: 13				
» 90 »		2/08	25	2: 75	0: 14				
» 106 »		2/09	10	1: 50	0: 18				
» 134 »		2/10	10	1: 80	0: 22				
» 162 »		2/11	10	2: —	0: 24				
» 190 »		2/12	10	2: 25	0: 27				
» 218 »		2/13	10	2: 50	0: 30				
» 246 »		2/14	10	2: 75	0: 33				
» 274 »		2/15	10	3: —	0: 36				
» 302 »		2/16	10	3: 30	0: 40				
» 330 »		2/17	10	3: 45	0: 42				
» 358 »		2/18	10	3: 90	0: 47				
» 386 »		2/19	10	4: —	0: 48				
» 500 »		2/20	10	4: 50	0: 55				
» 1000 »		2/21	10	9: —	1: 10				
» 2000 »		2/22	10	17: —	2: —				

Gängade stavar 4 mm med M3 gängor

Kärna	Totallängd								
10 mm (30) mm	2/30	25	3: 75	0: 18					
20 » (40) »	2/31	25	4: 25	0: 22					
30 » (50) »	2/32	25	5: —	0: 25					
40 » (60) »	2/33	25	6: 25	0: 30					
50 » (70) »	2/34	25	7: 25	0: 35					
60 » (80) »	2/35	25	8: 50	0: 40					
70 » (90) »	2/36	25	9: 75	0: 48					

Dragstänger, 2,5 mm tråd med öglor
längd mellan öglecentra

18,5 mm	2/40	25	5: 20	0: 25					
51 »	2/41	25	5: 20	0: 25					
70 »	2/42	25	5: 70	0: 28					
91 »	2/43	25	5: 70	0: 28					
110 »	2/44	25	5: 70	0: 28					
131 »	2/45	25	6: —	0: 30					
150 »	2/46	25	6: —	0: 30					
170 »	2/47	25	6: —	0: 30					

Axlar 6 mm Ø

längd 68 mm	2/51	10	2: 50	0: 30					
» 120 »	2/53	10	3: 40	0: 40					
» 180 »	2/55	10	5: —	0: 60					

3. Balkar



1 hål 23 mm	3/01	10	5: 50	0: 65					
2 » 51 »	3/02	10	6: —	0: 70					
3 » 78 »	3/03	10	6: 50	0: 75					
4 » 106 »	3/04	10	7: 50	0: 85					
5 » 134 »	3/05	10	8: 25	0: 95					
6 » 162 »	3/06	10	9: —	1: —					
7 » 190 »	3/07	10	9: 75	1: 10					
8 » 218 »	3/08	10	10: 50	1: 20					
9 » 246 »	3/09	10	11: 25	1: 25					
10 » 274 »	3/10	10	12: —	1: 35					
11 » 302 »	3/11	10	13: —	1: 45					
12 » 330 »	3/12	10	14: —	1: 55					
13 » 358 »	3/13	10	15: —	1: 65					
14 » 386 »	3/14	10	16: —	1: 80					

FAC

4. Stoppringar, hylsor m. m.

Stoppring för 6 mm axel	4/01	50	14: —	0: 35					
Stoppring för 4 mm axel	4/02	50	14: —	0: 35					
Lagerhylsa för 6 mm axel	4/03	50	9: —	0: 20					
Lagerhylsa för 4 mm axel	4/04	50	10: —	0: 22					
Hylsa 6/4 mm Ø längd 5 mm	4/05	50	3: 50	0: 08					
Hylsa 6/4 mm Ø längd 12 mm	4/06	50	5: —	0: 11					
Hylsa 6/4 mm Ø längd 20 mm	4/07	50	6: 50	0: 15					
Ring 8/6 mm Ø längd 2 mm	4/08	50	3: 50	0: 08					
Slitsad hylsa 6/4 mm längd 12 mm	4/09	50	6: 50	0: 15					

5. Hjul m. m.

Linhjulsplåt
42 mm Ø

5/01	25	5: 65	0: 25						
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Linhjul 16 mm Ø

Råshjulsplåt
54 mm Ø

5/20	10	10: —	1: 20						
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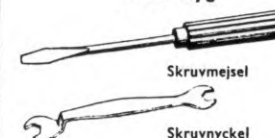
6. Kuggjul, snäckjul, snäckskruvar m. m.

Cylindriska kuggjul, modul 0,70, kuggbredd 3 mm,
för 4 mm axel:

kuggantal	Ø								
16	12,6 mm	6/16	4	8: —	2: 20				
för 6 mm axel:									
kuggantal	Ø								
24	18,2 mm	6/24	4	10: 50	2: 90				
32	23,8 »	6/32	4	12: 50	3: 45				
48	35,0 »	6/48	4	13: 50	3: 75				
64	46,2 »	6/64	4	15: —	4: 15				
80	57,4 »	6/80	4	19: —	5: 25				
96	68,6 »	6/96	4	26: —	7: 25				

Skivjul 46,2 mm Ø för
6 mm axel, bredd 2 mm.Snäckjul i mässing;
kuggbredd 5 mm (till
snäckskruv 6/51) 1:22
Modul 0,70
Snäckskruv i stål med 2
ing. (till snäckjul 6/50)
1:22 Modul 0,70Koniska kuggjul 1:1 av
mässing med frästa kug-
gar. Modul 0,80Koniska kuggjul 1:3 av
mässing med frästa kug-
gar. Modul 0,80

7. Verktyg

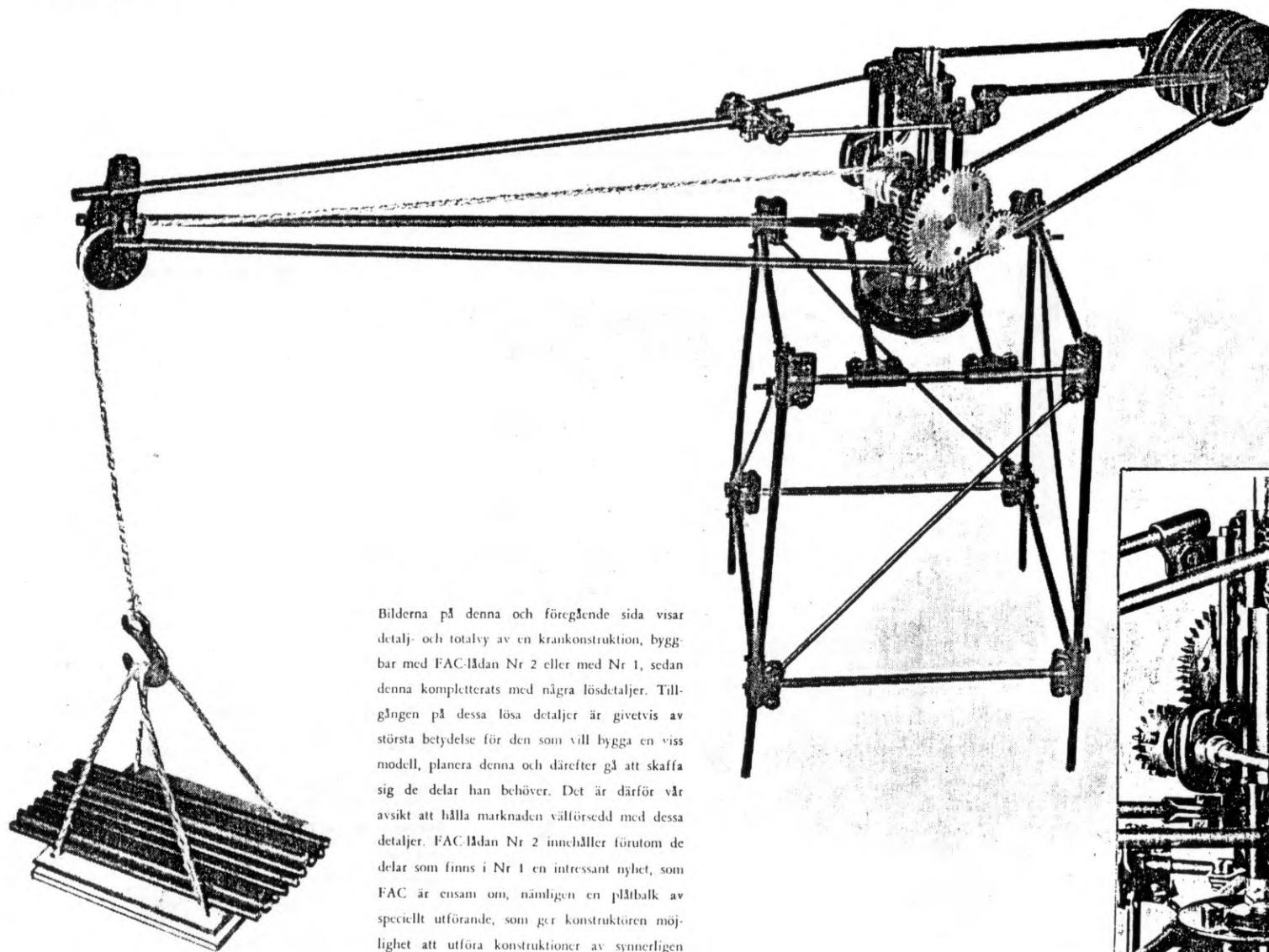


Skruvmejsel

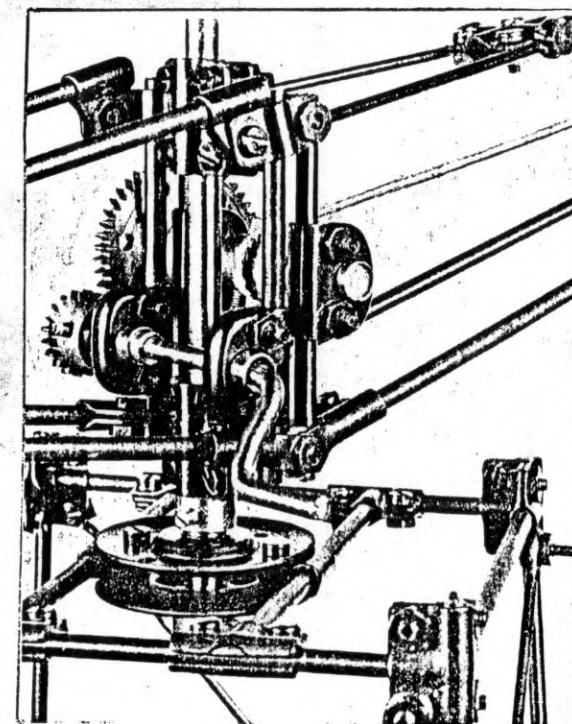
7/01	10	6: 35	0: 70						
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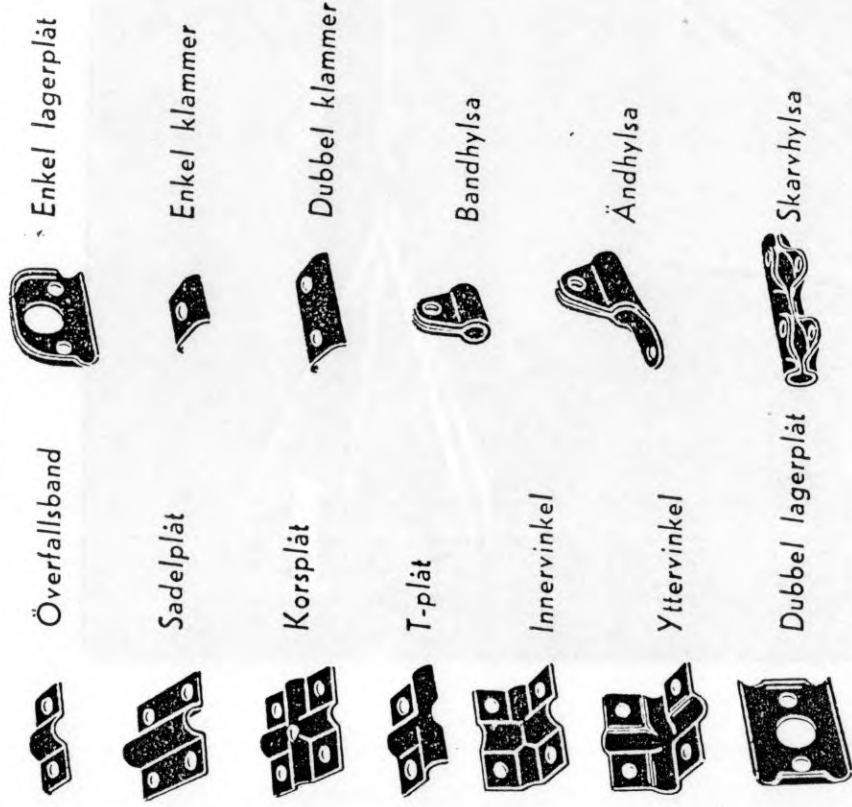
Skruvnyckel

7/02	10	2: 75	0: 30						
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Bilderna på denna och föregående sida visar detalj- och totalvy av en krankonstruktion, byggbar med FAC-lådan Nr 2 eller med Nr 1, sedan denna kompletterats med några lösdetaljer. Tillgången på dessa lösa detaljer är givetvis av största betydelse för den som vill bygga en viss modell, planera denna och därefter gå att skaffa sig de delar han behöver. Det är därför vår avsikt att hålla marknaden välförsedd med dessa detaljer. FAC-lådan Nr 2 innehåller förutom de delar som finns i Nr 1 en intressant nyhet, som FAC är ensam om, nämligen en plåtbalk av speciellt utförande, som ger konstruktören möjlighet att utföra konstruktioner av synnerligen elegant och stabil karaktär. Dessutom innehåller denna låda kugghjul av järn med frästa kuggar och av en kvalitet som man annars endast finner i instrument och apparater för industriens behov. På grund av att dessa kugghjul tillverkas som massartikel kan de säljas till ett lågt pris i förhållande till sin kvalitet.



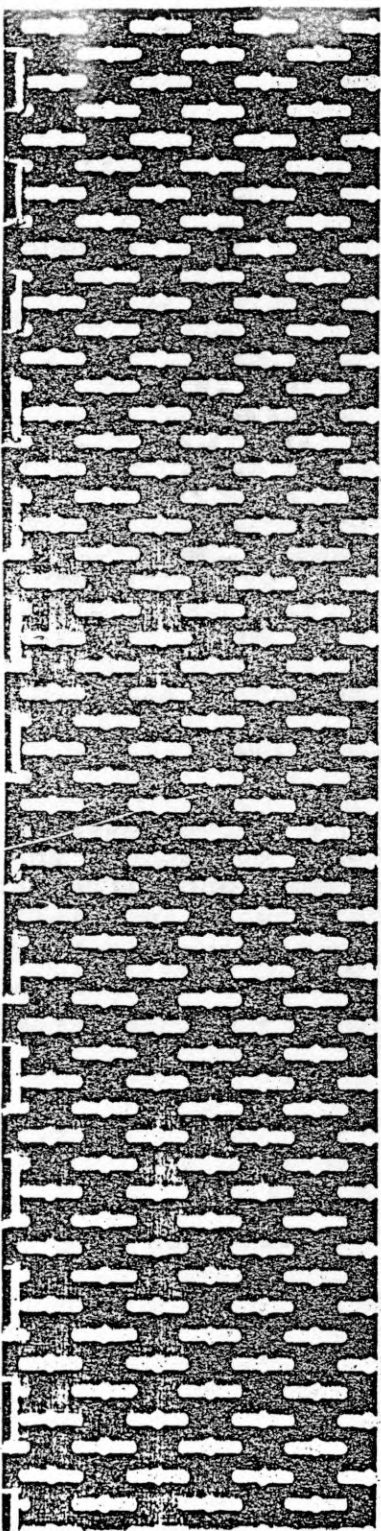


Ovan avbildade detaljer utgör FAC-systemets kärna. De svarta delarna är kopplingsplåtarna och klämhylsorna för de fasta konstruktionerna. Det är dessa element som sammanhåller stavar och balkar. Till höger därom visas de lagerhylsor, hylsor och stoppringar, som ingår i de rörliga konstruktionerna.

FAC NR 1 INNEHÅLLER:

Nr	Detalj	Antal	Nr	Detalj	Antal
1/01	Överfallsband	8	4/01	Stoppring för 6 mm axel, med stoppskrivar 8/08	2
1/02	Sadelplåt	4	4/03	Lagerhylsa för 6 mm axel	2
1/03	Korsplåt	4	4/05	Hylsa, 6/4 mm diam., längd 5 mm	4
1/04	T-plåt	4	4/06	" " " " 12 "	2
1/05	Innervinkel	4	4/07	" " " " 20 "	1
1/06	Yttervinkel	4	4/08	Ring 8/6 mm diameter	4
1/07	Enkel klammer	8	4/09	Slitsad hylsa 6/4 mm diameter	2
1/08	Dubbel klammer	4	5/01	Längd 12 mm	4
1/09	Bandhylsa	2	5/05	Linhjul 16 mm diameter	1
1/10	Ändhylsa	2	7/01	Skruvmejsel	1
2/03	Enkel lagerplåt	4	7/02	Skruvnyckel	1
2/04	Stavar, 4 mm diameter	3	8/01	Skruv med ostskalle M3×6 mm	ca 60
2/06	" " " "	4	8/02	" " " M3×8	ca 20
2/08	" " " "	4	8/03	" " " M3×12	12
2/09	" " " "	5	8/04	" " " M3×19	8
2/10	" " " "	4	8/10	Mutter M3×sextant	ca 80
2/11	" " " "	4	8/20	Bricka 8×3,2×0,8	8
2/13	Gängade stavar, 4 mm diameter med M3 gängor	4	9/01	Vev, längd 10 mm	1
2/30	10 mm (30)	1	9/02	Krok	1
2/32	30 mm (50)	2	9/10	Gummiring	2
2/41	Dragstänger av 2,5 mm tråd med öglor	4		Snöre, 1 meter	1
2/46	längd 51 mm	2		Instruktionsbok till FAC Nr 1	1
2/51	längd 150 mm	1			
2/53	längd 68 mm	1			
	längd 120 mm	1			

Patent sökt över hela världen.



FAC

MANUAL

F.A.C. SEPARATE PARTS LIST

No.	Description
AI-02	Rod 24mm x 4mm dia.
AI-03	" 38mm " "
AI-04	" 52mm " "
AI-05	" 66mm " "
AI-06	" 80mm " "
AI-07	" 94mm " "
AI-08	" I08mm " "
AI-I0	" I36mm " "
AI-II	" 556mm " "
A3-I0	Threaded rod IOmm plain,ends IOmm
A3-20	" " 20 " " "
A3-30	" " 30 " " "
A3-40	" " 40 " " "
A3-50	" " 50 " " "
A3-60	" " 60 " " "
A3-70	" " 70 " " "
A5-05	Tapped sleeve 5.2
A5-I2	" " I2.2
BI-02	Beam - I hole 24mm
BI-04	" 2 " 52mm
BI-06	" 3 " 80mm
BI-08	" 4 " I08mm
BI-I0	" 5 " I36mm
BI-I2	" 6 " I64mm
BI-I4	" 7 " I92mm
BI-I6	" 8 " 220mm
BI-I8	" 9 " 248mm
BI-20	" IO " 276mm
BI-22	" II " 304mm
BI-24	" I2 " 332mm
BI-26	" I3 " 360mm
BI-28	" I4 " 388mm
BI-30	" I5 " 4I6mm
BI-32	" I6 " 444mm
BI-34	" I7 " 472mm
BI-36	" I8 " 500mm
BI-38	" I9 " 528mm
BI-40	" 20 " 556mm
CI-52	Plate 80 x 38mm .6mm thick
CI-74	" IO8 x 66mm "
CI-92	" I36 x 38mm "
CI-95	" I36 x 80mm "
CI-99	" I36 xI36mm "
C2-52	" 80 x 38mm Imm "
C2-74	" IO8 x 66mm "
C2-92	" I36 x 38mm "
C2-95	" I36 x 80mm "
C2-99	" I36 xI36mm "
C5-52	Corner plate 79 x 38 x .6mm
C9-I7	Flanged plate 252 x 252 x I3mm
DI-I2	Tie rod I9.8 hole cen.
DI-I3	" " 24.3 "
DI-20	" " 28.0 "
DI-22	" " 39.6 "
DI-23	" " 48.5 "
DI-40	" " 56.0 "
DI-42	" " 79.2 "
DI-43	" " 97.0 "
DI-80	" " II2.0 "
DI-82	" " I58.4 "
FI-OI	Strap coupler 2I x 9mm
FI-02	T - Coupler 9 x I3mm
FI-03	Cross coupler 2I x 2Imm
F3-OI	Inside angle 2I x IOmm
F3-02	Outside angle 2I x IImm
F5-OI	Saddle coupler2I x 2Imm
F7-OI	Short clamp 9 x I3mm
F7-02	Long " 2I x I3mm
F9-OI	Plain clip IO x I3.5mm
F9-02	End " 23 x I3.5mm
F9-03	Joint clip 27
G4-40	Solid shaft 556mm x 4(h8) dia.
G6-40	" " 556mm x 6(h8) "
G7-40	Tubular shaft556mm x 6(h8) "
G8-40	Grooved " 556mm x 4(h8) "
G9-42	Bushing (lead screw) 8mm
HI-04	Collar 5mm hole 4mm
HI-06	" 5mm " 6mm
H2-04	Shaft head IO.8mm hole 4mm
H2-06	" " IO.8mm " 6mm
H3-04	Ring Imm hole 4mm
H3-I6	" Imm " 6mm
H4-05	Sleeve 5mm hole 4mm
H4-I2	" I2mm " 4mm
H4-20	" I9.5mm " 4mm
H5-I0	Split sleeve IOmm
H8-OI	Sliding dog I8mm
H8-02	Fixed dog I2mm
H9-06	Universal joint 26mm long
LI-I4	Bushing I2mm hole 4mm
LI-I6	" I2mm " 6mm
L3-06	Ball bearing 6mm wide hole 6mm
L5-04	Rod end IImm to hole sentre
L8-OI	Bushing clamp single rod 2I.5
L8-02	" " twin " 23 5
L9-06	Ball bearing box 23.5 x 22mm
L9-60	" " cover 20mm dia.
L9-64	" " insert IOmm
NI-OI	Wheel disc 42.5 dia.
NI-02	" spoke disc 42.5 dia.
NI-05	Flanged wheel 57.5 dia
N3-OI	Disc web
N3-03	Flanged rim 9Imm dia.
N3-05	Slewing ring I42mm dia.
N5-04	Loose pulley I5.6 dia bore 4mm
N5-06	Fixed " I5,6 " " 6mm
N7-46	Hub disc 46.2 dia
N8-42	Cam blank 42mm "
N9-63	Handwheel 63mm "

continued over----

List compiled by F.Beadle

continued over-----

List compiled by F.Beadle

PI-I6 Spur gear I6 teeth
 PI-24 " " 24 "
 PI-32 " " 32 "
 PI-48 " " 48 "
 PI-64 " " 64 "
 PI-80 " " 80 "
 PI-96 " " 96 "
 P3-64 Internal spur gear 64 teeth
 P5-35 Rack 35 teeth
 QI-02 Worm R.H. double thread
 QI-40 " gear 40 teeth

RI-I8 Bevel gear I8 teeth
 R3-20 " " 20 "
 R3-60 " " 60 "

SI-0I Chain Im length
 SI-I4 Sprocket I4 teeth
 SI-28 " 28 "

TI-06 Screw cheese head 6mm long
 TI-09 " " " 9mm "
 TI-I5 " " " I5mm "
 TI-24 " " " 24mm "
 T3-I2 " - eye

T4-02 Nut hexagonal
 T5-08 Washer
 T6-03 Set screw allen type 2.75mm long
 T6-05 " " " " 5mm "
 T7-03 " " slotted type 2.75mm long
 T7-05 " " " " 5mm "
 T9-09 Roll pin 9mm long
 T9-I2 " " I2mm "

UI-0I Two hole link
 UI-02 Three hole link
 UI-05 Angle link
 U3-0I Hook
 U5-0I Thrust spring I5mm long
 U5-02 Spring seat
 U5-05 Tension spring 278mm long
 U7-0I Ratchet pawl hole centres I9.2mm
 U7-02 " spring

WI-0I Rubber tyre fits N5-04 or N5-06
 WI-02 " " " NI-0I " NI-02
 WI-03 " " " Ni-05
 W9-0I Socket wrench
 W9-02 Open end wrench
 W9-03 Allen wrench

OTHER NOTES:

The total parts in the FAC system I56 in a wide range with plenty of gears and other working parts.

Parts are precision engineered to a high degree of accuracy.

Actual working machines can be built up in correct industrial fashion.

The sprocket chain is joined in the same way as Meccano chain.

Most parts are in black metal finish, but some of the parts are bronze finish.

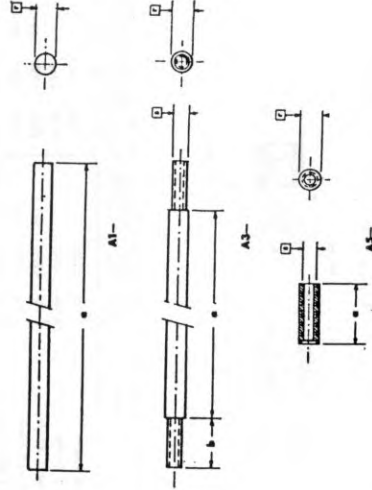
The rods serve two main purposes, I as rods on the correct sence, and 2 as structure lengths for models instead of perforated strips in the majority of building systems. Note the gantry crane in the references.

The model Gang saw gives some idea of the rugged structures that can be built to represent actual machine tools.

List compiled by F.Beadle

RAC

RAC



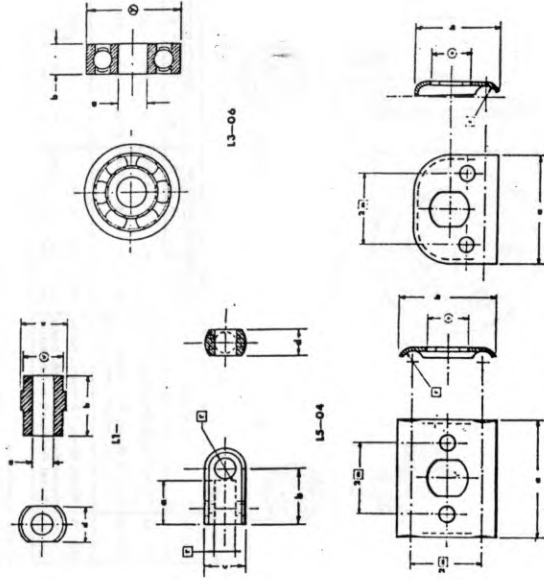
Drawn in scale 1:1

Part No.	Part name	Dimensions in millimeters			Dimensions in inches		
		a	b	c	a	b	c
A1-02	Rod	24			.95		
A1-03	Rod	32			1.25		
A1-04	Rod	32			1.25		
A1-05	Rod	40			1.57		
A1-06	Rod	40			1.57		
A1-07	Rod	40			1.57		
A1-08	Rod	40			1.57		
A1-09	Rod	40			1.57		
A1-10	Rod	40			1.57		
A1-11	Rod	40			1.57		
A1-12	Rod	40			1.57		
A1-13	Rod	40			1.57		
A1-14	Rod	40			1.57		
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A1-237	Rod						



KAL

65



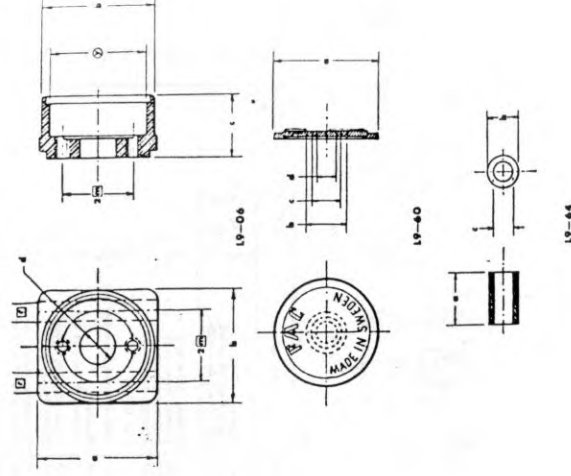
L3-01

Drawn in scale 1:1

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
		a	b	c	d	a	b	c	d
L1-14	Bushing, bronze	4(E9)	12	9		.1589	.472	.315	
L1-16	Bushing, bronze	6(E9)	12	9		.2376	.472	.315	
L3-06	Ball Bearing steel, SKF, internat. standard dim.	6	6			.2361	.234		
L5-04	Rad End, bronze	7	11	8	5	.28	.433	.315	.196
L8-01	Bushing Clamp, single red steel, thickness 1 mm (.04 in.)	21.5	17			.85	.67		
L8-02	Bushing Clamp, twin red steel, thickness 1.2 mm (.05 in.)	23.5	20			.93	.79		

Materials as noted.

See symbols $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ and dimensional tolerances see page 76.

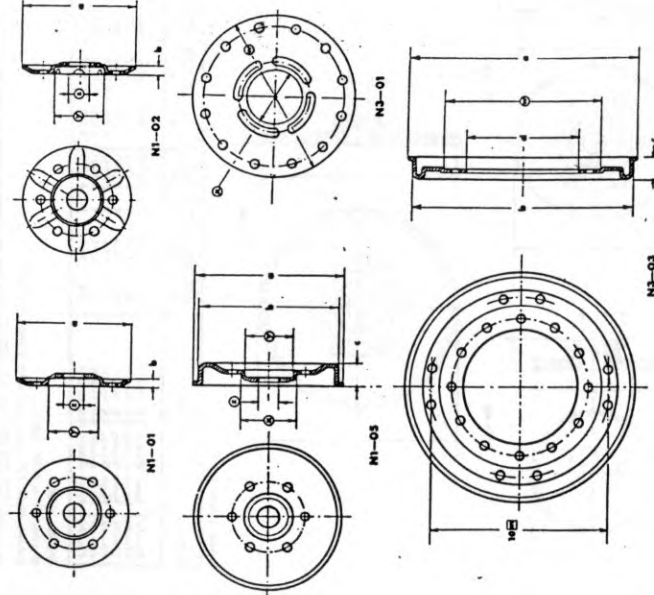


Drawn in scale 1:1

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
		a	b	c	d	a	b	c	d
L9-06	Ball Bearing Box bronze or aluminum	23.5	22	12.4	7	.93	.87	.48	.28
L9-40	Bearing Box Cover cadize anodic	20	8.2	4.2	4.2	.79	.32	.24	.17
L9-64	Ball Bearing Insert, zinc	10	6	4		.40	.237	.157	

Materials as noted.

See symbols $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ and dimensional tolerances see page 76.

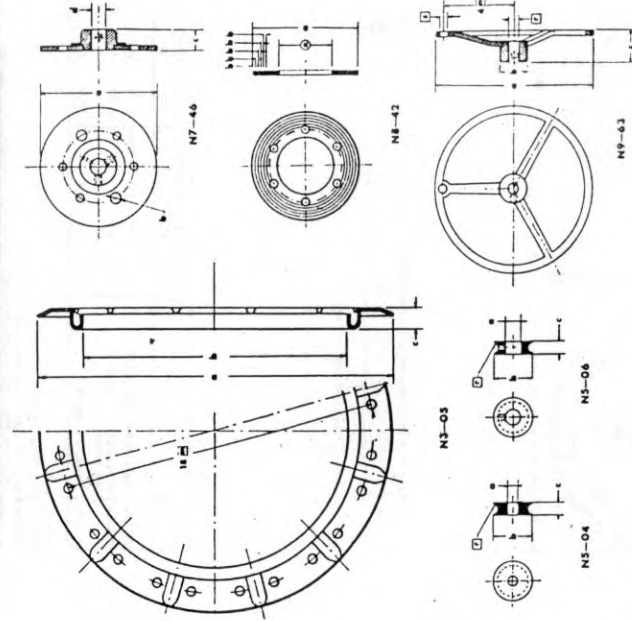


Drawn in scale 1:2

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
		a	b	c	d	a	b	c	d
N1-01	Wheel Disc	42.5	2.6			1.67	.10		
N1-02	Winged Wheel	42.5	2.6			1.67	.10		
N1-03	Flanged Rim	57.5	24	8.5		2.25	2.13	.33	
N3-01	Disc Web	91	87.8	7.8	46.2	3.58	3.46	.31	1.83
N3-03	Flanged Rim								

Materials: steel, thickness 1 mm (.04 in.) unless otherwise noted.

See symbols $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ and dimensional tolerances see page 76.

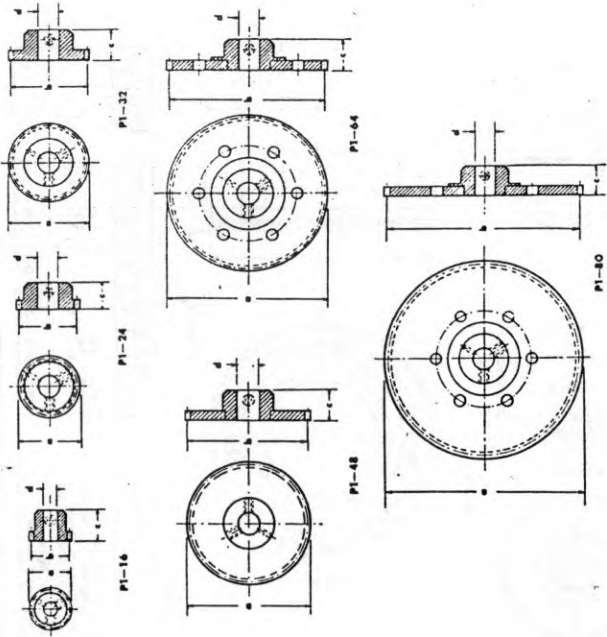


Drawn in scale 1:2

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
		a	b	c	d	a	b	c	d
N3-05	Slowing Ring steel, 1 mm (.04 in.)	142	106	7.8		5.59	4.17	.31	
N5-04	Loose Pulley, bronze	4(H9)	15.6	5		.1581	.61	.196	
N5-06	Fixed Pulley, bronze	4(H9)	15.6	5		.1581	.61	.196	
N7-46	Disc Hub	46.2	4	8	4(H8)	1.818	.1581	.315	.2364
N8-42	Cam Blank	42	1	12.5		1.654	.0394		.49
N9-63	Handwheel	43	11	12.5		1.69	.43		

Materials: steel, thickness 2 mm (.08 in.) unless otherwise noted.

See symbols $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ $\square$ and dimensional tolerances see page 76.

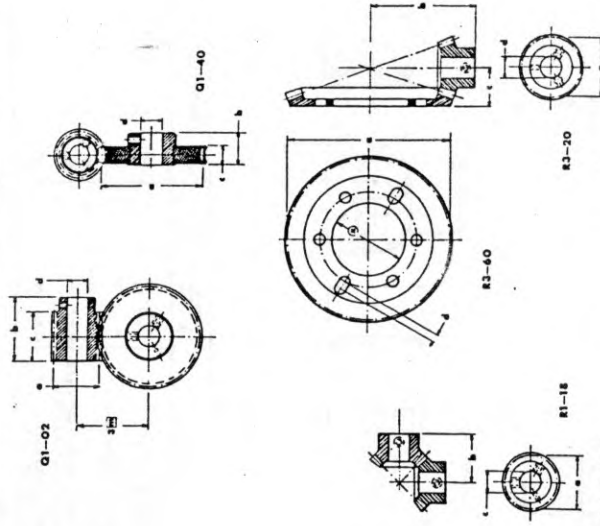


Drawn in scale 1:1.5

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
a	b	c	d	e	f	a	b	c	d
P1-16	Spur Gear, 16 teeth	12.6	11.2	9	4 [H8]	.496	.4409	.354	.1579
P1-24	Spur Gear, 24 teeth	18.2	16.8	9	4 [H8]	.717	.6614	.354	.2366
P1-32	Spur Gear, 32 teeth	23.8	22.4	9	4 [H8]	.937	.8811	.354	.2366
P1-48	Spur Gear, 48 teeth	35.0	33.6	9	4 [H8]	1.378	1.3218	.354	.2366
P1-64	Spur Gear, 64 teeth	46.2	44.8	9	4 [H8]	1.819	1.7638	.354	.2366
P1-80	Spur Gear, 80 teeth	57.4	56.0	9	4 [H8]	2.260	2.2047	.354	.2366

Material: steel.
Module: 0.7 = DP34 approx.
Pressure angle: 20°. Gear tooth width 3 mm (.118 in.).

Re symbols [a] [b] [c] [d] [e] [f] and dimensional tolerances see page 76.

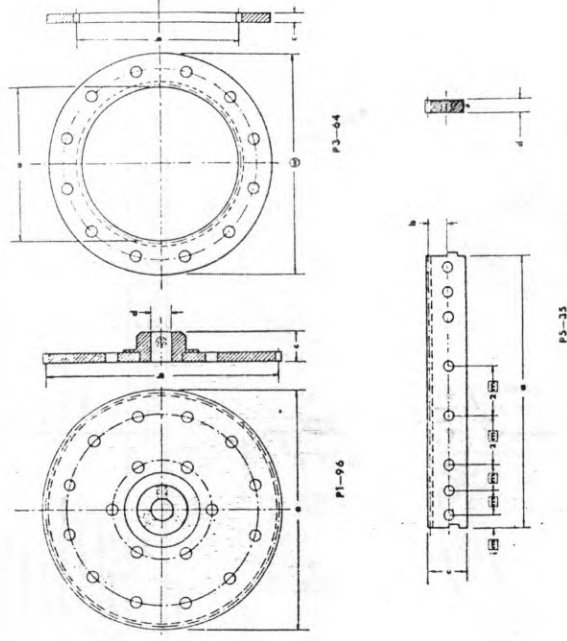


Drawn in scale 1:1.5

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
a	b	c	d	e	f	a	b	c	d
Q1-02	Worm, R.H. double thread, steel	14	19	14	6 [H8]	.551	.748	.551	.2366
Q1-40	Worm Gear, 40 teeth fabric base laminate with steel hub	28	9	5	6 [H8]	1.102	.354	.197	.2366
R1-18	Bevel Gear, 18 teeth, bronze	15.5	13.7	6 [H8]		.61	.54		.2366
R3-20	Bevel Gear, 20 teeth, bronze	17.5	20.8	11.4	6 [H8]	.69	1.17	.45	.2366
R3-40	Bevel Gear, 40 teeth, bronze	48.5	29.8	11.4	2	1.91	1.17	.45	.08

Material: as noted.
Worm Gear: Pressure angle 20°. Module: 0.7 = DP34 approx.
Bevel Gear: Module: 0.8 = DP32 approx.

Re symbols [a] [b] [c] [d] [e] [f] and dimensional tolerances see page 76.

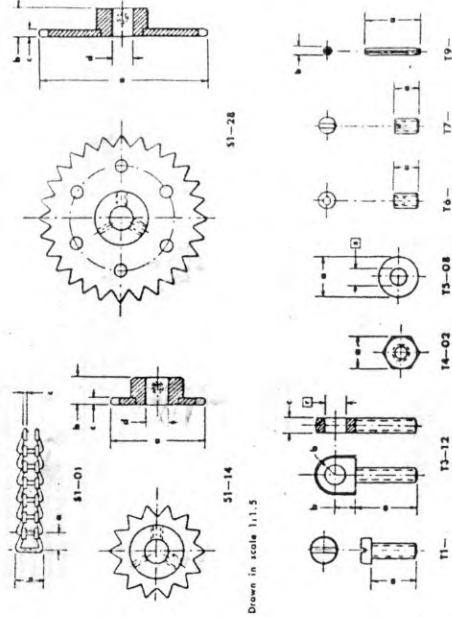


Drawn in scale 1:1.5

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
a	b	c	d	e	f	a	b	c	d
P1-96	Spur Gear, 96 teeth	68.4	67.2	9.5	6 [H8]	2.701	2.6457	.37	.2366
P3-64	Internal Spur Gear, 64 teeth	43.4	44.8	3		1.709	1.7638	.118	
P5-35	Rack, 35 teeth	77.0	5.6	11.8	4	3.032	.2305	.465	.127

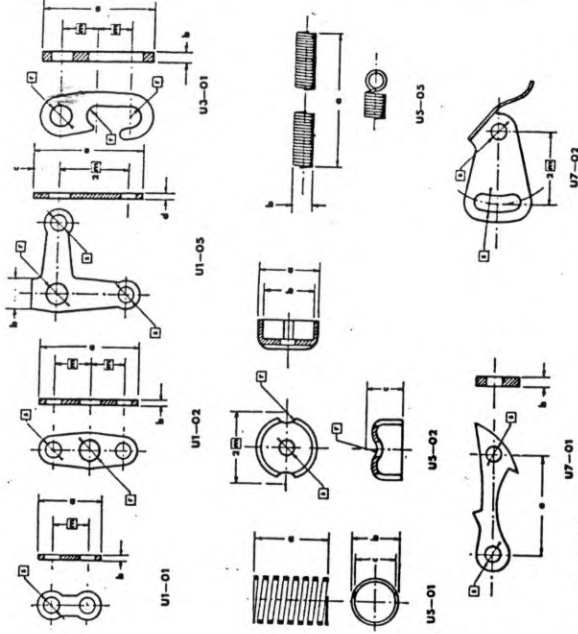
Material: steel.
Module: 0.7 = DP34 approx.
Pressure angle: 20°. Gear tooth width 3 mm (.118 in.).

Re symbols [a] [b] [c] [d] [e] [f] and dimensional tolerances see page 76.



Drawn in scale 1:1.5

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
a	b	c	d	e	f	a	b	c	d
S1-01	Chain, 1 m (40 in.)	4.34	6.75	0.9		.179	.27	.035	
S1-28	Sprocket, 28 teeth	24.8	8	2	6 [H8]	1.76	.32	.08	.2366
S1-35	Sprocket, 35 teeth	31.4	8	2	6 [H8]	1.76	.32	.08	.2366
T1-06	Screw, chase head	6				.24			
T1-09	Screw, chase head	9				.35			
T1-12	Screw, chase head	12				.47			
T1-15	Screw, chase head	15				.59			
T1-18	Screw, chase head	18				.71			
T1-21	Screw, chase head	21				.83			
T1-24	Screw, chase head	24				.95			
T1-27	Screw, chase head	27				1.07			
T1-30	Screw, chase head	30				1.19			
T1-33	Screw, chase head	33				1.31			
T1-36	Screw, chase head	36				1.43			
T1-39	Screw, chase head	39				1.55			
T1-42	Screw, chase head	42				1.67			
T1-45	Screw, chase head	45				1.79			
T1-48	Screw, chase head	48				1.91			
T1-51	Screw, chase head	51				2.03			
T1-54	Screw, chase head	54				2.15			
T1-57	Screw, chase head	57				2.27			
T1-60	Screw, chase head	60				2.39			
T1-63	Screw, chase head	63				2.51			
T1-66	Screw, chase head	66				2.63			
T1-69	Screw, chase head	69				2.75			
T1-72	Screw, chase head	72				2.87			
T1-75	Screw, chase head	75				2.99			
T1-78	Screw, chase head	78				3.11			
T1-81	Screw, chase head	81				3.23			
T1-84	Screw, chase head	84				3.35			
T1-87	Screw, chase head	87				3.47			
T1-90	Screw, chase head	90				3.59			
T1-93	Screw, chase head	93				3.71			
T1-96	Screw, chase head	96				3.83			
T1-99	Screw, chase head	99				3.95			
T1-102	Screw, chase head	102				4.07			
T1-105	Screw, chase head	105				4.19			
T1-108	Screw, chase head	108				4.31			
T1-111	Screw, chase head	111				4.43			
T1-114	Screw, chase head	114				4.55			
T1-117	Screw, chase head	117				4.67			
T1-120	Screw, chase head	120				4.79			
T1-123	Screw, chase head	123				4.91			
T1-126	Screw, chase head	126				5.03			
T1-129	Screw, chase head	129				5.15			
T1-132	Screw, chase head	132				5.27			
T1-135	Screw, chase head	135				5.39			
T1-138	Screw, chase head	138				5.51			
T1-141	Screw, chase head	141				5.63			
T1-144	Screw, chase head	144				5.75			
T1-147	Screw, chase head	147				5.87			
T1-150	Screw, chase head	150				5.99			
T1-153	Screw, chase head	153				6.11			
T1-156	Screw, chase head	156				6.23			
T1-159	Screw, chase head	159				6.35			
T1-162	Screw, chase head	162				6.47			
T1-165	Screw, chase head	165				6.59			
T1-168	Screw, chase head	168				6.71			
T1-171	Screw, chase head	171				6.83			
T1-174	Screw, chase head	174				6.95			
T1-177	Screw, chase head	177				7.07			
T1-180	Screw, chase head	180				7.19			
T1-183	Screw, chase head	183				7.31			
T1-186	Screw, chase head	186				7.43			
T1-189	Screw, chase head	189				7.55			
T1-192	Screw, chase head	192				7.67			
T1-195	Screw, chase head	195				7.79			
T1-198	Screw, chase head	198				7.91			
T1-201	Screw, chase head	201				8.03			
T1-204	Screw, chase head	204				8.15			
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T1-210	Screw, chase head	210				8.39			
T1-213	Screw, chase head	213				8.51			
T1-216	Screw, chase head	216				8.63			
T1-219	Screw, chase head	219				8.75			
T1-222	Screw, chase head	222				8.87			
T1-225	Screw, chase head	225				8.99			
T1-228	Screw, chase head	228				9.11			
T1-231	Screw, chase head	231				9.23			
T1-234	Screw, chase head	234				9.35			
T1-237	Screw, chase head	237				9.47			
T1-240	Screw, chase head	240				9.59			
T1-243	Screw, chase head	243				9.71			
T1-246	Screw, chase head	246				9.83			
T1-249	Screw, chase head	249				9.95			
T1-252	Screw, chase head	252				10.07			
T1-255	Screw, chase head	255				10.19			
T1-258	Screw, chase head	258				10.31			
T1-261	Screw, chase head	261				10.43			
T1-264	Screw, chase head	264				10.55			
T1-267	Screw, chase head	267				10.67			
T1-270	Screw, chase head	270				10.79			
T1-273	Screw, chase head	273				10.91			
T1-276	Screw, chase head	276				11.03			
T1-279	Screw, chase head	279				11.15			
T1-282	Screw, chase head	282				11.27			
T1-285	Screw, chase head	285				11.39			
T1-288	Screw, chase head	288				11.51			
T1-291	Screw, chase head	291				11.63			
T1-294	Screw, chase head	294				11.75			
T1-297	Screw, chase head	297				11.87			
T1-300	Screw, chase head	300				11.99			
T1-303	Screw, chase head	303				12.11			
T1-306	Screw, chase head	306				12.23			
T1-309	Screw, chase head	309				12.35			
T1-312	Screw, chase head	312				12.47			
T1-315	Screw, chase head	315				12.59			
T1-318	Screw, chase head	318				12.71			
T1-321	Screw, chase head	321				12.83			
T1-324	Screw, chase head	324				12.95			
T1-327	Screw, chase head	327				13.07			
T1-330	Screw, chase head	330				13.19			
T1-333	Screw, chase head	333				13.31			
T1-336	Screw, chase head	336				13.43			
T1-339	Screw, chase head	339				13.55			
T1-342	Screw, chase head	342				13.67			
T1-345	Screw, chase head	345				13.79			
T1-348	Screw, chase head	348				13.91			
T1-351	Screw, chase head	351				14.03			
T1-354	Screw, chase head	354				14.15			
T1-357	Screw, chase head	357				14.27			
T1-360	Screw, chase head	360				14.39			
T1-363	Screw, chase head	363				14.51			
T1-366	Screw, chase head	366				14.63			
T1-369	Screw, chase head	369				14.75			
T1-372	Screw, chase head	372				14.87			
T1-375	Screw, chase head	375				14.99			
T1-378	Screw, chase head	378				15.11			
T1-381	Screw, chase head	381				15.23			
T1-384	Screw, chase head	384				15.35			

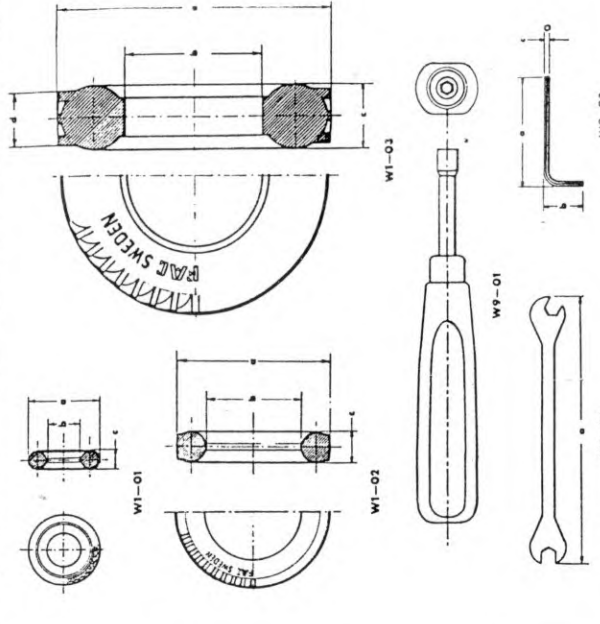


Down in scale 1:1

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
		a	b	c	d	a	b	c	d
U1-01	Two Hole Link	12.5	1.2			.49	.05		
U1-02	Three Hole Link	19.2	1.2			.77	.05		
U1-03	Angle Link	21.8	6			.86	.24		
U2-01	Hook	22.5	2			.89	.08		
U2-02	Thrust Spring	15	9.8	7.8		.60	.386	.307	
U2-03	Spring	12	10	7		.47	.39	.28	
U3-01	Spring	278	4			11	.157		
U7-01	Ratchet Pawl	19.2	2			.756	.08		
U7-02	Ratchet Spring, phosphor bronze								

Material: steel, unless otherwise noted.

Be symbols and dimensional tolerances see page 76.



Down in scale 1:2

Part No.	Part name	Dimensions in millimeters				Dimensions in inches			
		a	b	c	d	a	b	c	d
W1-01	Rubber Tire, vehicle type	26	12.5	7.5		1.00	.50	.30	
W1-02	Rubber Tire, vehicle type	60	37	11		2.40	1.50	.45	
W1-03	Rubber Tire, vehicle type	104	53.5	25	20	4.10	2.10	1.00	.80
W2-01	Socket Wrench	103				4.10			
W2-02	Open End Wrench	43	16	1.37		1.70	.63	.05	
W2-03	Allen Wrench								

Material: as noted.

Be symbols and dimensional tolerances see page 76.

NOTE: All parts lists shown are reduced to half manual size

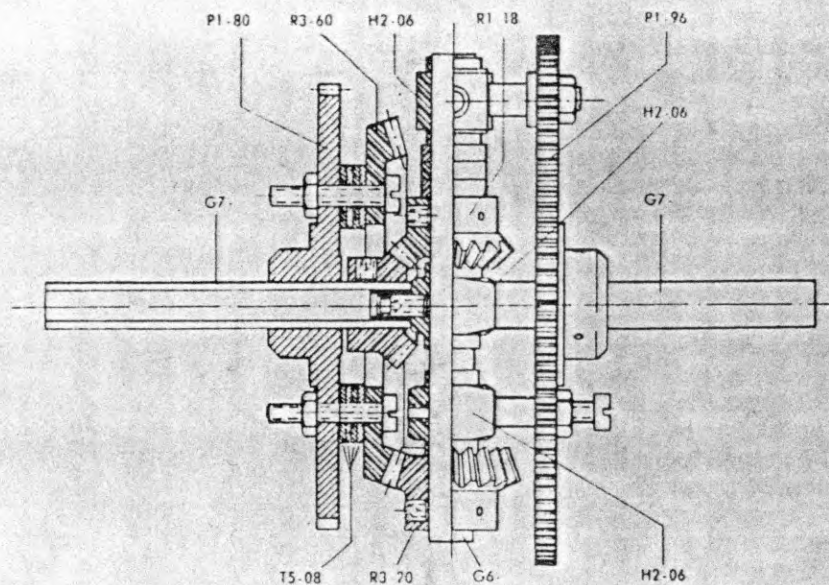


Fig. 713. — Differential arrangement comprising two bevel gear sets with 1:1 and 1:3 reduction, respectively. Driving the Tubular Shaft on the left in the drawing, the central Bevel Gear R1-18 drives the satellite shaft with Bevel Gear R3-20 at one end meshing with Crown Gear R3-60 which is mounted on free-wheeling Spur Gear P1-80. If the satellite shaft is immobilized, i. e. Spur Gear P1-96 held stationary, a reduction of 1:3 will obtain between input shaft and Gear P1-80. If Gear P1-80 is prevented from rotating, Spur Gear P1-96 will instead rotate at 1:4 reduced speed.

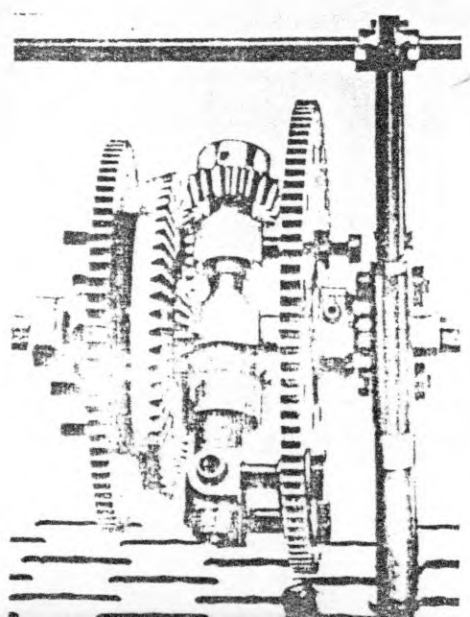


Fig. 714. — Photo of the differential.

Special gear ratios

When facing the task of building a gear train with a reduction ratio unobtainable with FAC Spur Gears, or when the resulting gear train would be unnecessarily complicated, the problem can be solved by using a differential to split the desired reduction ratio in two terms, both of which may be readily achieved by means of available spur gears. — Two examples will serve to illustrate the procedure.

Suppose that a gear ratio of 11:24 is desired. The numerator 11 is a prime number and cannot be achieved in the normal manner with the spur gears available except by a long drawn out process of approximation which will still not yield an exact result. — We can write, however,

$$\frac{11}{24} = \frac{1}{2} \cdot \frac{8+3}{12} = \frac{1}{2} \left(\frac{8}{12} + \frac{3}{12} \right) = \frac{1}{2} \cdot \left(\frac{2}{3} + \frac{1}{4} \right)$$

Hence, if we reduce the speed of input shaft 1 in fig. 715 by means of one 2:3 gear train, gears 2 and 5, and one 1:4 train, gears 4 and 3, and use the two reduced speeds to drive the side gears of differential 6, the satellite carrier output shaft 7 will rotate at the desired 11:24 reduction ratio.

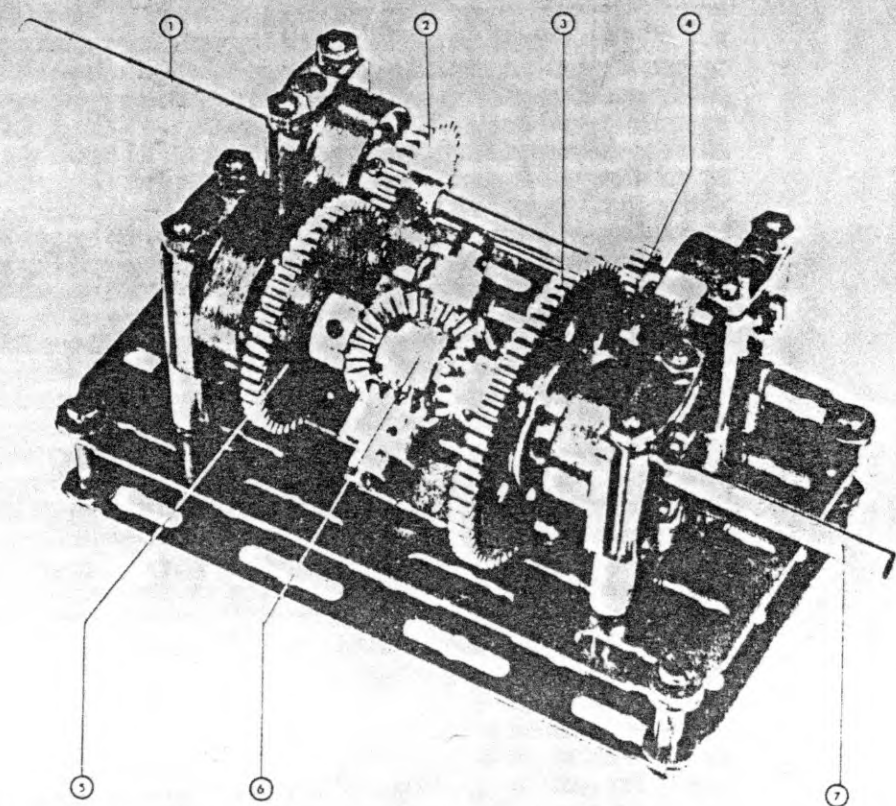


Fig. 715. — Special reduction gearset.

Gear no.	2	3	4	5
No. of teeth	32	64	16	48

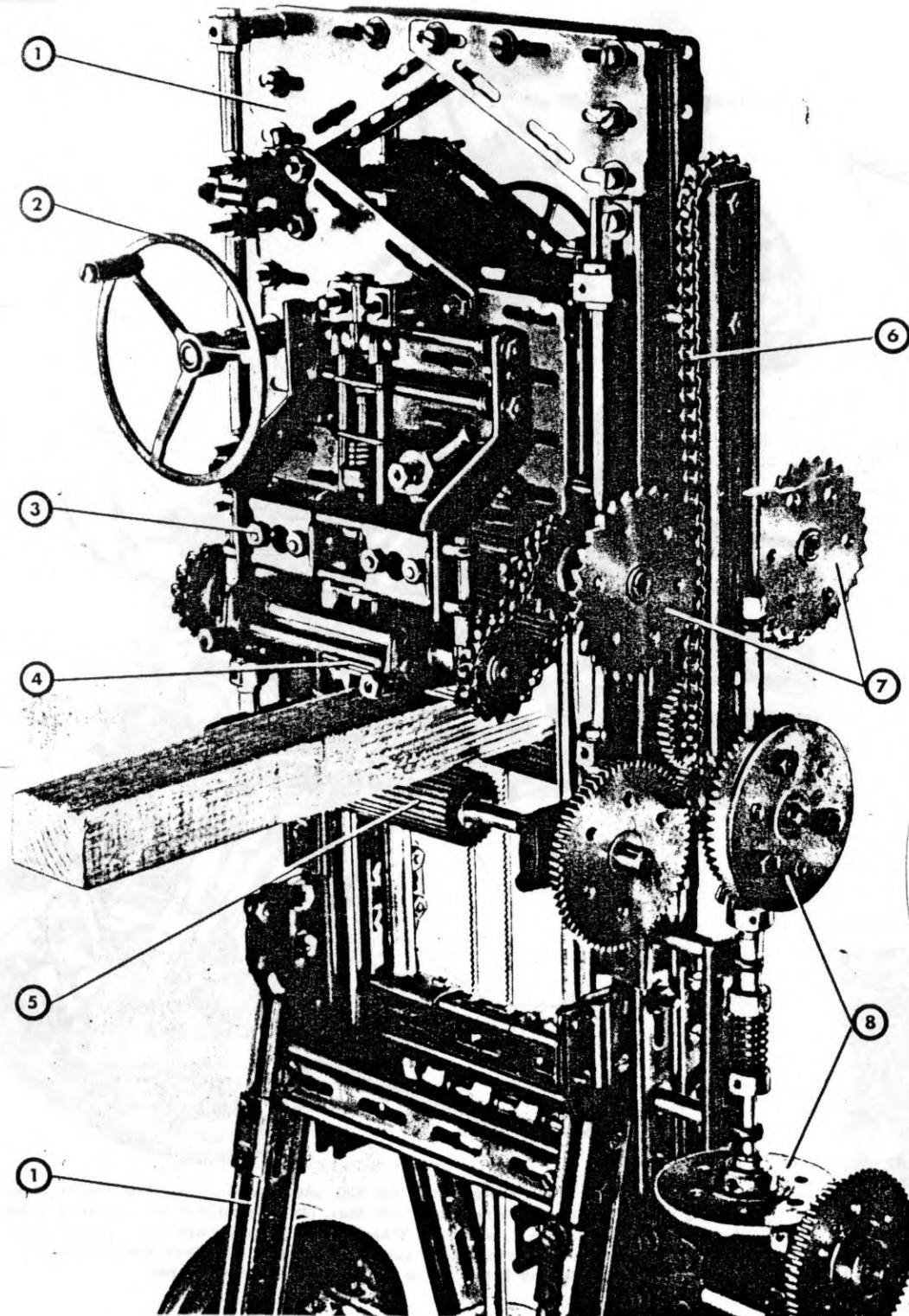


Fig. 424. — Gang saw model built with FAC parts and having all the functions of a full-scale machine. The model provides a good example of a relatively simple Twin Beam structure capable of taking up considerable mechanical stress and vibration. It also serves to illustrate the high degree of concentration of moving parts practicable in a structure of this kind.

One column of the machine frame carries the feed mechanism 8 which is driven from the crank system in the lower part of the machine frame. A friction and chain-and-sprocket transmission drives the feed rolls 4 and 5 at a speed suited to the quality of "timber" being cut, and to the number and cutting power of the saw-blades.

The upper feed roll housing 3, with feed roll 4 of serrated rubber tubing, is adjustable for height by means of handwheel 2; sprockets 7 which transmit the motion to the upper feed roll, then move along drive chain 6.

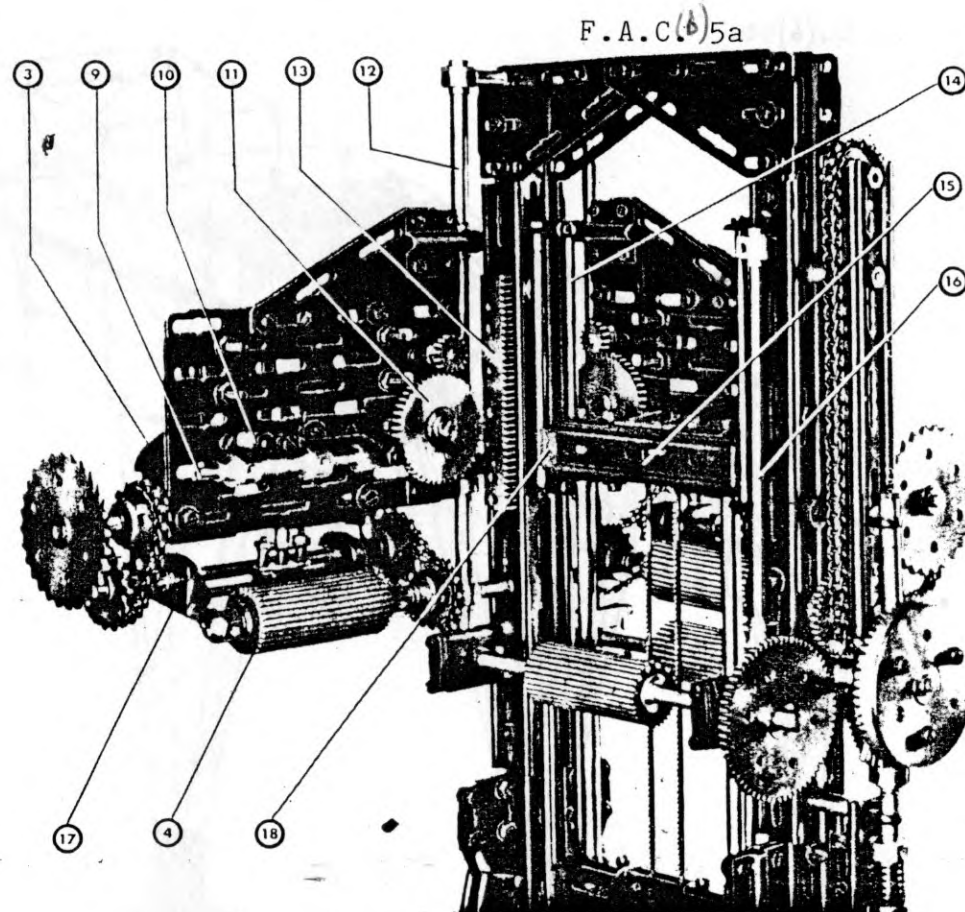


Fig. 425. — Upper feed roll housing 3 opened out to show inside arrangement of feed roll 4 on spring-loaded rocker 17.

When closed, housing 3 is locked by operating lever 10 which shoots bolt 9 behind vertical rod 16. The housing is raised and lowered by turning handwheel 2 which operates gear 11 in engagement with rack 13. — The housing swings on vertical shaft 12.

The loose frame 15 in which the saw-blades are mounted, is another example of a strong light-weight movable structure made of Twin Beams and Threaded Rods reinforced by Tubular Shafts G7-. The frame is driven by the underlying crank mechanism and slides on pockenholz shoes 18 — specially made — along guides 14.

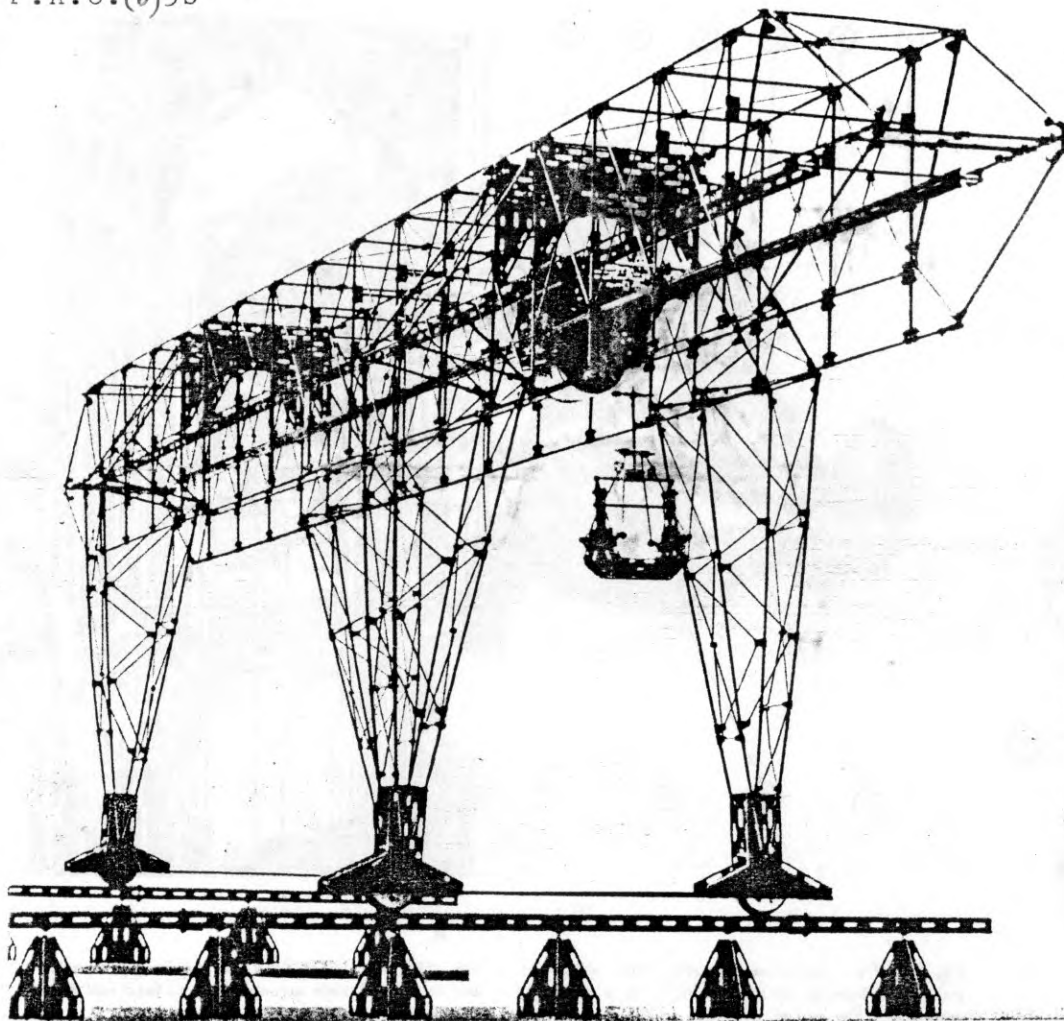
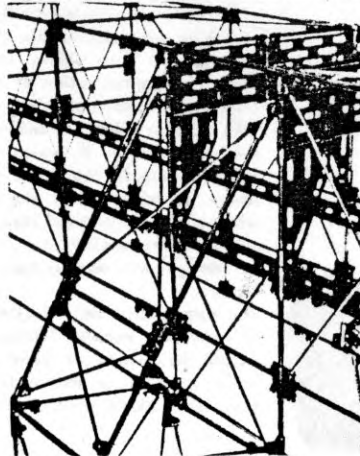


Fig. 301. — Bridge crane model built largely with clamped connections.

Close-up of lattice. ►



Linkages

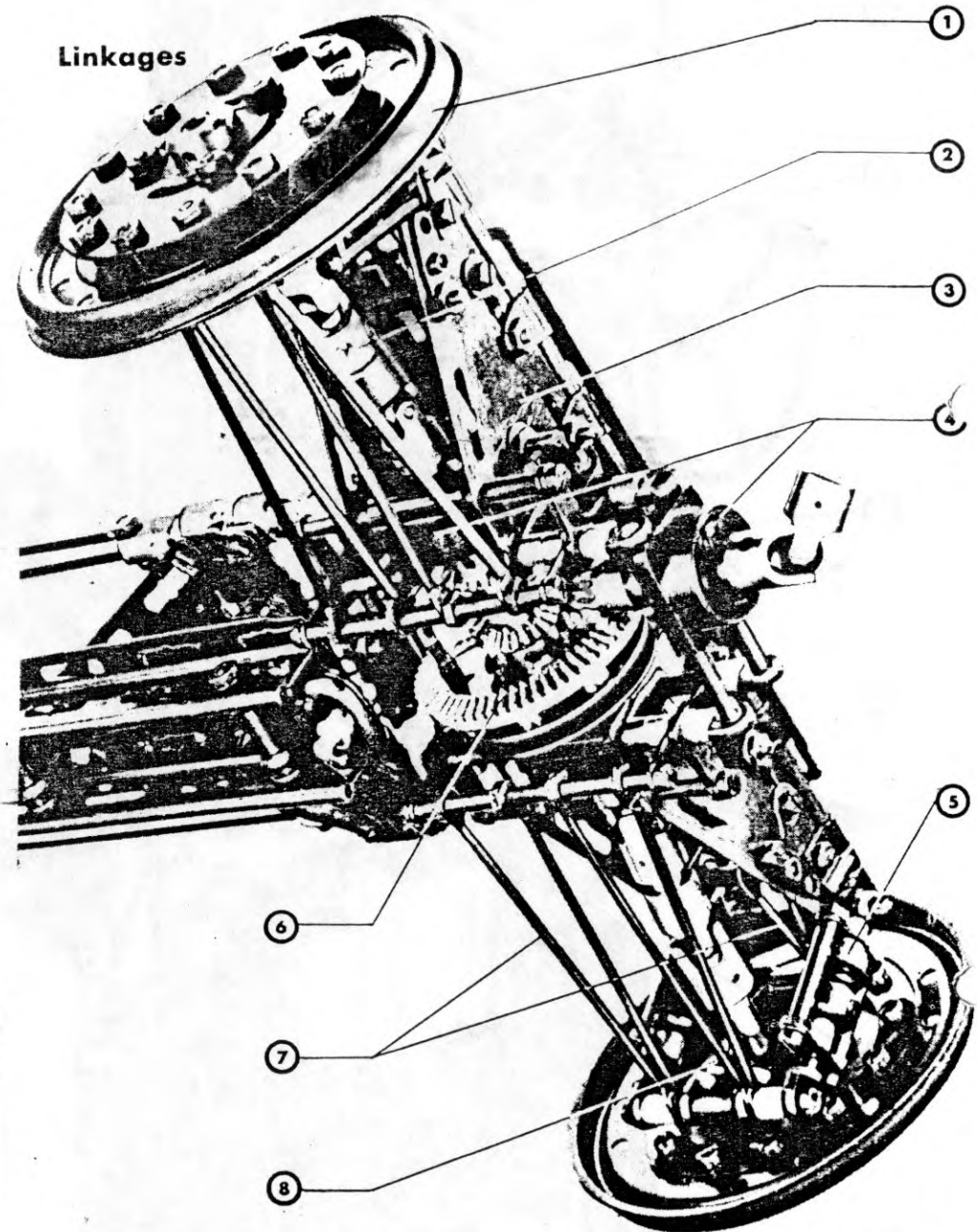


Fig. 621. — Rear end of the railcar bogie, fig. 430, underside view. — The chassis consists of a frame 3 made of Corner Plates reinforced with Rods. The differential 6, built according to fig. 712 and running in Ball Bearings 4, drives the Wheels 1 via Shafts 2 fitted with Universal Joints. The wheels are mounted on wishbone arms 7 built from Tie Rods and fitted with two Springs 5 per set of wishbones. Ball Bearing Box 8 lies in the plane of the wheel proper.

FAC

List of Contents

X - 1

FAC Minor Industrial Construction Kit, type X-1, contains 1,300 parts
plus screws, nuts and washers, totalling approx. 2,600 parts

Part No		Qty	Part No		Qty
A1-02	Rod	4	C2-52	Plate, 1 mm thickness	2
A1-03	"	8	C2-74	" , "	2
A1-04	"	4	C2-92	" , "	2
A1-05	"	4	C2-95	" , "	2
A1-06	"	12	C2-99	" , "	2
A1-07	"	4	C5-52	Corner Plate	8
A1-08	"	4	C9-17	Base Plate	1
A1-10	"	12			
A1-40	"	6	D1-12	Tie Rod	6
A3-10	Threaded Rod	16	D1-13	" "	6
A3-20	" "	16	D1-20	" "	6
A3-30	" "	8	D1-22	" "	6
A3-40	" "	8	D1-23	" "	6
A3-50	" "	8	D1-40	" "	6
A3-60	" "	12	D1-42	" "	6
A3-70	" "	12	D1-43	" "	6
			D1-80	" "	6
			D1-82	" "	6
A5-05	Tapped Sleeve	150	F1-01	Strap Coupler	32
A5-12	" "	100	F1-02	T- "	40
B1-02	Beam Section	4	F1-03	Cross "	16
B1-04	" "	4	F3-01	Inside Angle Coupler	32
B1-06	" "	8	F3-02	Outside " "	12
B1-08	" "	4	F5-01	Saddle Coupler	8
B1-10	" "	8	F7-01	Short Clamp Coupler	32
B1-12	" "	4	F7-02	Long " "	32
B1-16	" "	4	F9-01	Plain Clip	16
B1-18	" "	4	F9-02	End "	12
B1-28	" "	2	F9-03	Joint "	12
B1-36	" "	2			
B9-01	Beam End Plate	4	G4-40	Solid Shaft, ϕ 4 mm	2
B9-02	Beam Offset Plate	6	G6-40	" " , ϕ 6 "	2
C1-52	Plate, 0,6 mm thickness	6	G7-40	Hollow " , ϕ 6/4 mm	1
C1-74	" , "	2	G8-40	Slotted " , ϕ 4 "	1
C1-92	" , "	2	H1-04	Collar for ϕ 4 mm	12
C1-95	" , "	2			
C1-99	" , "	2			

FAC

List of Contents

X - 1

Part No		Qty	Part No		Qty
H1-06	Collar for ϕ 6 mm shaft	12	Q1-02	Worm, double thread	1
H2-04	Dog for ϕ 4 " "	12	Q1-40	" Gear, 40 teeth	1
H2-06	" "	12	R1-18	Bevel Gear	4
H3-04	Spacer for ϕ 4 " "	50	R3-20	" "	1
H3-16	" " ϕ 6 " "	25	R3-60	" "	1
H4-05	Sleeve, length 5 mm	25	S1-01	Chain	1
H4-12	" , " 12 "	25	S1-14	Sprocket, 14 teeth	1
H4-20	" , " 19,8 "	25	S1-28	" , 28 "	1
H5-10	Split Sleeve	8	T1-06	Screw, Fillister head	300
H8-01	Key "	1	T1-09	" , " "	100
H8-02	Key Collar	1	T1-15	" , " "	100
H9-06	Universal Joint	2	T1-24	" , " "	50
L1-14	Bush for ϕ 4 mm		T3-12	Eye Screw	25
L1-15	" " ϕ 6 "		T4-02	Nut	500
L3-06	Ball Bearing	4	T5-08	Washer	200
L5-04	Link Bearing	4	T6-03	Set-Screw, Allen type	25
L8-01	Bush Clamp, single rod	16	T6-05	" " " "	25
L8-02	" " , twin "	24	T9-09	Pin	25
L9-06	Ball Bearing Box	4	T9-12	"	25
L9-60	Bearing Box Cover	12	U1-01	Two-Hole Link	10
L9-64	Ball Bearing Sleeve	4	U1-02	Three-Hole Link	25
N1-01	Angle Flange Wheel	8	U1-05	Toggle Link	8
N1-02	Spoke Wheel Centre	4			
N1-05	Rail Flange Wheel	8	U5-01	Helical Spring	8
N3-01	Flat Disc	2	U5-02	Spring Set Cup	16
N3-03	Rail Flange Rim	2	U5-05	Tension Spring	1
N5-04	Pulley	4	U7-01	Ratchet	2
N5-06	Set-Screw Pulley	2	U7-02	" Spring	2
N7-46	Hub Wheel	3	W1-01	Rubber Tyre	4
N8-42	Cam Blank	2	W9-01	Box Spanner	1
N9-63	Hand Wheel	1	W9-02	Spanner	2
P1-16	Spur Gear, 16 teeth	4	W9-03	Key for Allen type Screws	2
P1-24	" " , 24 "	4			
P1-32	" " , 32 "	2 (4)			
P1-48	" " , 48 "	2			
P1-64	" " , 64 "	2			
P1-80	" " , 80 "	1			

June, 1960

FAC[b]: X1.6a

FAC Major Industrial Construction Kit, type X-2, contains 2,370 parts, plus screws, nuts and washers - in all approximately 4,670 parts.

Part No.	Qty.	Part No.	Qty.
A1-02 Rod	8	D1-12 Tie Rod	4
A1-03 "	4	D1-13 " "	4
A1-04 "	8	D1-20 " "	8
A1-05 "	8	D1-22 " "	8
A1-06 "	8	D1-23 " "	8
A1-07 "	8	D1-40 " "	12
A1-08 "	4	D1-42 " "	12
A1-10 "	12	D1-43 " "	12
A1-40 "	12	D1-80 " "	12
		D1-82 " "	12
A3-10 Threaded Rod	25	F1-01 Strap Coupler	100
A3-20 " "	25	F1-02 T-Coupler	100
A3-30 " "	25	F1-03 Cross Coupler	50
A3-40 " "	25		
A3-50 " "	25	F3-01 Inside Angle Coupler	100
A3-60 " "	25	F3-02 Outside " "	50
A3-70 " "	25		
A5-05 Tapped Sleeve	200	F5-01 Saddle Coupler	25
A5-12 " "	100		
B1-02 Beam Section	4	F7-01 Short Clamp	100
B1-04 " "	8	F7-02 Long Clamp Coupler	50
B1-06 " "	8		
B1-08 " "	4	F9-01 Plain Clip Coupler	50
B1-10 " "	8	F9-02 End " "	50
B1-12 " "	4	F9-03 Joint " "	25
B1-16 " "	4		
B1-18 " "	4	G4-40 Solid Shaft, ϕ 4 mm.	4
B1-20 " "	4		
B1-28 " "	4	G6-40 " " ϕ 6 mm.	2
B1-36 " "	4		
		G7-40 Hollow " ϕ 6/4 mm.	1
B9-01 Beam End Plate	12		
B9-02 Beam Offset Plate	12	G8-40 Slotted " ϕ 4 mm.	1
C1-52 Plate, 0.6 mm. Thickness	4	H1-04 Collar for ϕ 4 mm.	12
C1-74 " " " "	2	H1-06 " " ϕ 6 mm.	12
C1-92 " " " "	4		
C1-95 " " " "	4	H2-04 Dog for ϕ 4 mm.	16
C1-99 " " " "	2	H2-06 " " ϕ 6 mm.	16
C2-52 Plate, 1 mm. Thickness	4	H3-04 Spacer for ϕ 4 mm.	50
C2-74 " " " "	2	H3-06 " " ϕ 6 mm.	25
C2-92 " " " "	4		
C2-95 " " " "	4	H4-05 Sleeve, length 5 mm.	50
C2-99 " " " "	2	H4-12 " " 12 mm.	25
		H4-20 " " 19.8 mm.	25
C5-52 Corner Plate	12		
		H5-10 Split Sleeve	25
C9-17 Base Plate	2		
		H8-01 Key Sleeve	2
		H8-02 Key Collar	2

art No.	Qty.	Part No.	Qty.
H9-06 Universal Joint	2	T5-08 Washer	300
L1-04 Bush for ϕ 4 mm.	16	T6-03 Set-Screw, Allen type	50
L1-06 " " ϕ 6 mm.	16	T6-05 " " " "	75
L3-06 Ball Bearing	8	T9-09 Pin	25
L5-04 Link Bearing	8	T9-12 Pin	25
L8-01 Bush Clamp, single rod	25	U1-01 Two-Hole Link	25
L8-02 " " twin rod	50	U1-02 Three-Hole Link	25
L9-06 Ball Bearing Box	8	U1-05 Toggle Link	25
L9-60 Bearing Box Cover	24		
L9-64 Ball Bearing Sleeve	8	U3-01 Hook	10
N1-01 Angle Flange Wheel	8	U5-01 Helical Spring	10
N1-02 Spoke Wheel Centre	8	U5-02 Spring Set Cup	20
N1-05 Rail Flange Wheel	8	U5-05 Tension Spring	2
N3-01 Flat Disc	4		
N3-03 Rail Flange Rim	2	U7-01 Ratchet	2
N3-05 Spoke Rim	2	U7-02 Ratchet Spring	2
N5-04 Pulley	8	W1-01 Rubber Tyre	8
N5-06 Set-Screw Pulley	8		
N7-46 Hub Wheel	4	W9-01 Box Spanner	1
		W9-02 Spanner	2
N8-42 Cam Blank	2	W9-03 Key for Allen type Screws	4
N9-63 Hand Wheel	2		
P1-16 Spur Gear, 16 teeth	4		
P1-24 " " 24 "	4		
P1-32 " " 32 "	4		
P1-48 " " 48 "	2		
P1-64 " " 64 "	2		
P1-80 " " 80 "	2		
P1-96 " " 96 "	1		
P3-64 Spur Gear Ring, 64 teeth	1		
P5-35 Rack, 35 teeth	2		
Q1-02 Worm, double thread	1		
Q1-40 Worm Gear, 45 teeth	1		
R1-18 Bevel Gear	4		
R3-20 " "	1		
R3-60 " "	1		
S1-01 Chain	2		
S1-14 Sprocket, 14 teeth	2		
S1-28 " 28 "	2		
T1-06 Screw, Fillister head	500		
T1-09 " " "	300		
T1-15 " " "	200		
T1-24 " " "	50		
T3-12 Eye Screw	25		
T4-02 Nut	1,000		

The FAC construction system is made in Sweden for
FAC DIVISION OF OVERSEAS COMMODEX CORP.
8-10 Bridge Street
NEW YORK 4, N. Y. Phone: Bowling Green 9-4946



FAC[c]: X1.3

Det. no.	Detailj	Detail	Detail
25 20	Vevstakshuvud	Connecting rod end	Pjuelestängenkopf
25 30	Gaffelhuvud	Fork head	Gabelkopf
25 32	Tung huvud	Tongue head	Zungenkopf
25 36	Pinne med flans	Pin with flange	Shift mit Flansche
25 50	Dragjäder	Tension spring	Zugfeder
25 60	Tryckjäder	Thrust spring	Druckfeder
25 61	Fjädersäle	Spring seat	Federstz
25 70	Ratt	Handwheel	Handrad
25 80	Ledarskruv	Lead screw	Steuerschraube
25 83	Löpmutter	Lead nut	Eckmutter
25 86	Kugghjul	Spur gear	Zahnrad
31 35	Kugstäng	Rack	Zahnstange
31 64	Kuggkran	Gear ring, internal	Zahnkranz, innen
32 16	Kugghjul	Spur gear	Zahnrad
33 16-24	Planethjul	Planet wheel	Planetenrad
37 18-20	Konisk kugghjul	Bevel gear	Kegelrad
37 60	Konisk kuggkran	Bevel gear ring	Kegelzahnkranz
38 00-20	Snäckskruv	Worm	Schnecke
38 11-20	Snäckhjul	Steering worm gear	Schneckenrad
39 01	Kedja (rull-)	Roller chain	Rollenkette
39 02	Kedjelås	Chain joint	Kettenschloss
39 10-30	Kedjehjul	Sprocket	Kettenrad
39 70	Kedja (tråd-)	Chain (wire)	Pignon de chaîne
39 84-98	Kedjehjul	Sprocket	Zahnkette (Drakt)
41 00-01	Nav	Hub	Pignon de chaîne
08 01	Hylsnyckel	Socket wrench	Nabe
08 02-03	Fast nyckel	Open end wrench	Steckschlüssel
08 04	Allen-nyckel	Allen wrench	Mutterschlüssel
08 06	Skruvmejsel	Screw driver	Allen cief
			Schraubenzieher

TOLERANSER. Generellt gäller för icke passmåt $\pm 0,1$, för korresponderande längdmått $\pm 0,05$ samt för slätska passningsyor (håi och axlar): för hål H8 (-0 +0,018) och för axlar h8 (+0 -0,018).

TOLERANCES. In general applies for non-fit measurements $\pm 0,1$, for corresponding length measurements $\pm 0,05$ and for spherical fit surfaces (holes and shafts): for holes H8 (-0 +0,018) and for shafts h8 (+0 -0,018).

TOLERANZEN. In der Regel gilt für nicht Passungsmasse $\pm 0,1$, für korrespondierende Längenmassen $\pm 0,05$ und für sphärische Passungstätchen (Löcher und Wellen): für Löcher H8 (-0 +0,018) und für Wellen h8 (+0 -0,018).

TOLERANCES. D'une manière générale pour les dimensions qui ne sont pas des cotes étalon $\pm 0,1$, pour des cotes longitudinales correspondant $\pm 0,05$ et pour des surfaces étalon sphériques (trous et arbres): pour des trous H8 (-0 +0,018) et pour des arbres h8 (+0 -0,018).

TECKENFÖRKÄRLING
MARK INDEX

ZEICHENERKLÄRUNG
EXPLICATION DES SIGNES

FAC

Det. no.	Detailj	Detail	Detail
10 03-40	Stav	Stab	Barre
11 01-10	Skruvstav	Stab mit Gewinden	Barre filetée
11 20	Heligångad stav	Stab mit Vollgewinde	Barre filetée sans fin
11 75-82	Muff	Muffe	Manchon
12 01-18	Balk	Balken	Longeron
13 12-82	Ogösläng	Augestange	Boulon à œil
14 04-06	Distansring	Anneau d'écartement	Anneau d'écartement
14 11-13	Distanshylsa	Abstandshülse	Douille d'écartement
14 15-50	Rör	Rohr	Tuyau
15 20	Hörnplatta	Eckblech	Gousset
15 21-44	Platta	Platte	Plaque
15 86	Basplatta	Grundplatte	Semelle
16 01	Beam offset plate	S-Platte	Pied en S
16 05	Sativben	Supporting leg	Pied de support
16 10-11	Överfallskoppling	Flanged strap coupling	Chapeau de palier
16 12	T-koppling	T-Verbindung	Raccord en T
16 13	Korskoppling	Cross coupler	Raccord croisé
16 15	Innervinkel	Inside angle	Angle d'intérieur
16 16	Yutervinkel	Outside angle	Angle d'extérieur
16 20	Vinkelkoppling	Angular junction	Raccord angulaire
16 30	Kort klämkoppling	Angular coupling	Pince de serrage, c.
16 31	Lång klämkoppling	Long clamp	Pince de serrage, l.
16 40	Klammylisa	Klemmuffe	Douille de pression
16 41	Andhyllsa	End clip	Douille en bout
16 42	Sarvhyllsa	Joint clip	Douille d'assemblage
16 50	Trehålslänk	Three hole link	Joint à trois trous
16 50	Vinkellänk	Angle link	Joint angulaire
17 03-05	Stoppskruv	Set screw	Goupille filetée
17 06-24	Skruv	Screw	Vis
17 40	Ogölskruv	Eye screw	Piton
17 63-64	Mutter	Nut	Eccrou
17 70-72	Bricka	Washer	Scheibe
17 75	Låsbricka	Lock washer	Sicherungsblech
20 04-15	Axel	Solid shaft	Welle
20 38-40	Axel m. spår	Grooved shaft	Nutenwelle
20 41-42	Bom	Key	Keile
20 50	Växelöföre	Gear shift bar	Schaltzabel
20 51	Glidkoppling	Sliding coupling	Gierkupplung
20 61	Axellapp	Sub axle	Achszapfen
20 70-71	Spårning	Retaining ring	Nutenring
20 80	Differentialt centrum	Differential centre	Centre différentiel
21 04-06	Lagerhyllsa	Bushing	Buchse

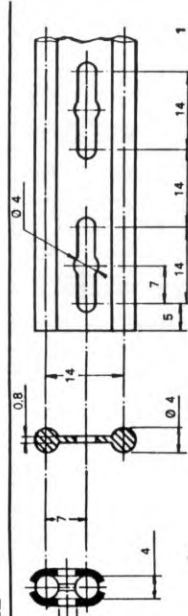
Det. no.	Detailj	Detail	Detail
21 11	Lagerhållare 1 släv	Bushing clamp (single rod)	Support de coussinet (une barre)
21 12	Lagerhållare 2 slävar	Bushing clamp (twin rod)	Support de coussinet (deux barres)
21 24	Lagerbussning	Bushing	Coussinet
21 34-36	Kullager	Ball bearing	Roulement à billes
21 37	Stärskt kullager	Sphär. kugellager	Roulement sphérique
21 38	Axialkullager	Axial ball bearing	Roulement axial
21 54	Kullagerhållare	Bearing cage	Cage de roulement
21 56	Kullagerbox	Bearing box	Boîtier de roulement
21 57	Invärdig låsring	Lock ring, inner	Bague de blocage
22 01-02	Stoppning	Retaining ring	Bague d'arrêt
22 03-04	Stjävlåsande bricka	Self-locking washer	Rondelle auto-serrante
22 14-16	Tärning	Shaft head	Achsenkopf
22 20	Slithyllsa	Split sleeve	Splitthülse
22 30	Nylonhyllsa	Nylon insert	Nylonbüchse
23 01	Hjulplåt	Wheel disc	Radscheibe
23 06	Hjulplåt m. fläns	Flanged disc	Flanschscheibe
23 10	Hållende skiva	Perforated disc	Lochscheibe
23 20	Sor flänshjulspått	Flanged rim	Flanschring
23 30	Radialspjarring	Centerless wheel	Radialnutring
23 40	Stränghjulsträng	Flywheel ring	Schwungrad
23 46	Planethjulskaiva	Planet wheel disc	Planetradscheibe
23 50	Hållende hjul	Perforated wheel	Lochreisrad
23 51	Friktionskiva	Friction disc	Reibscheibe
23 61	Bryttrissa	Loose pulley	Laufträdchen
23 62	Remtrissa	Pulley	Riemenscheibe
23 65-68	Remskiva	"	"
23 90	Gummidäck	Rubber tire	Gummireifen
23 91	Plaströp	Plastic cord	Kunststoffriemen
23 92-93	O-ring	O-ring	O-Ring
24 06	Frihjulshälva	Free wheel case	Freilaufnabe
24 08-09	Expansionsfjäder	Expansion spring, right and left	Reasort d'expansion, droit et gauche
24 10	Kopplingsring	Coupling ring	Kupplungsring
24 20	Axelslärhyllsa	Shaft sleeve	Wellenverbindungshülse
24 30	Kardanknut	Universal joint	Kardangelenk
25 01	Tvärstycke	Slide cross head	Querstück
25 09	Kurvmall	Cam pattern	Kurvenschablone
25 10	Kamskivämne	Cam disc material	Fahrscheibemat.
25 11-14	Vipparm	Rock arm	Schwingehebel
25 18	Låsbleck	Lock plate	Schlossblech

x ej FAC detailj

non FAC detail

nicht FAC Detail

ne pas FAC détail



MODULEN. Fig. 1 visar hur FAC-modulen, 7 mm, tillkommit. Det vanligaste passmattet, 14 mm, återfinnes hos de flesta komponenterna.

Fig. 2 visar händelningen för samtliga Plator, vilka har ordnats i händelse- och tidsserier. Den första händelsen i alla Plator är att bakkant (64 mm) tilligger mellan två plator utan att brytes. Baspaltorna, som ligger mot kanten, har motsvarande avstånd (7 mm). De mindre plattornas tjocklek är 2 mm, de större 3 mm.

MODULUS. Fig. 1 shows the origin of the Fac modulus, 7 mm. The usual tit measurement, 14 mm, will be applicable to most components.

Fig. 2 shows the indexing for all Plates, which, except the Base plates, have a distance of 5 mm from the outer holes to the edge. This admits for instance that a beam holder (ø 4 mm) be located between two plates without disturbing the proper relation of the consecutive holes existing to the modulus. The corresponding distance (7 mm) to the modulus, however, is 12 mm. The thickness of the smaller plates is 2 mm, of the larger 3 mm.

MODUL. Bild 1 zeigt wie der FAC-Modul, 7 mm, entwickelt ist. Das gewöhnlichste Passungsmass, 14 mm, gilt für die meisten Komponenten.

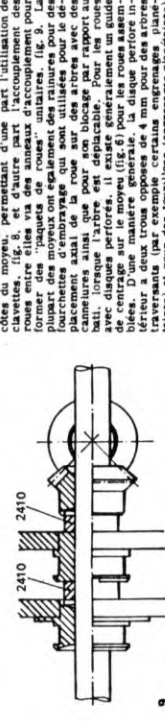
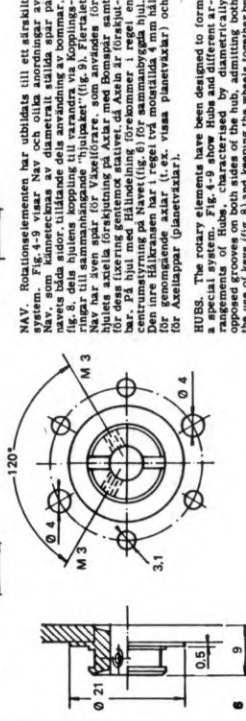
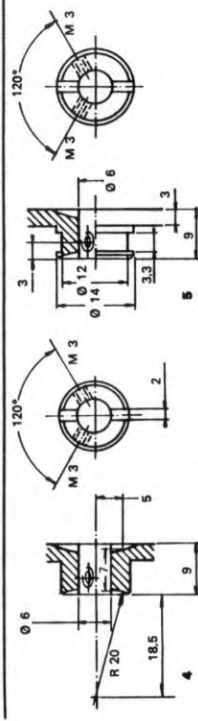
Bild 2 zeigt die Lochentplatzung für sämtliche Platten, welche mit Ausnahme von den Grundplatten einen Abstand von 5 mm von den äußeren Bordkanten zum Rand haben. Die gestrichelten Platten sind die zusammengehörenden zwischen zwei Platten, eine das zusammengehörende Lochentplatzung in Verhältnis zu dem Modul gestört wird. Die Grundplatten, die Rand gegen Rand platziert werden, haben einen entsprechende Abstand (7 mm). Die Dicke der kleineren Platten ist 2 mm, die der größeren 3 mm.

MODULE. La fig. 1 montre comment le module FAC-7 mm. a été calculé. La cote étalon, 14 mm., se retrouve dans la plupart des éléments.

La fig. 2 montre la division des trous pour toutes les plaques, lesquelles, à l'exception des plaques de base, ont une distance de 5 mm entre les trous extrêmes et le trou central. Les plaques de base ont une distance de 10 mm (ø 4 mm) qui permet, par exemple à un bord de longeron (ø 4 mm) d'être placé entre deux plaques sans interruption de rapport modulaire de la division des trous. Les plaques de base, mises bord à bord, ont un écartement correspondant (7 mm). L'épaisseur des petites plaques est de 2 mm et celle des grandes plaques, de 3 mm.

La fig. 3 montre le schéma de division des disques perforés.

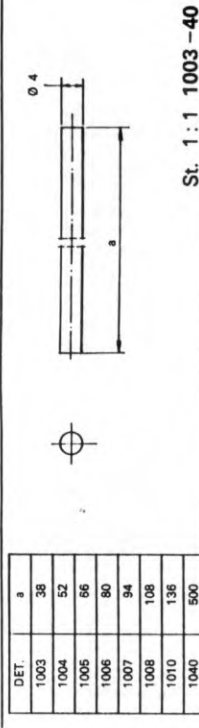
La fig. 3 montre le schéma de division des disques perforés.

[illegible]

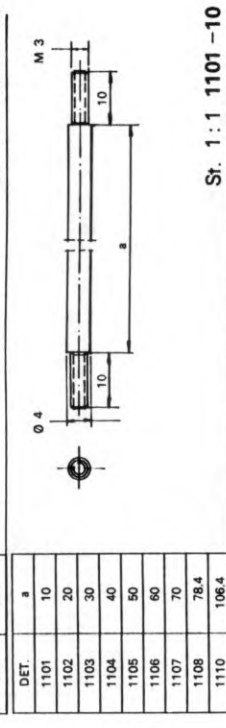
HUBS. The rotary elements have been designed to form a special system. Figs. 4-9 show hubs and different arrangements of them. The hubs are made of steel or aluminum alloy. They have two opposite grooves on both sides of the hub, admitting both the keys (figs. 8) and keeping the wheels together by the coupling rings (5). A compact wheel unit (fig. 9). Most hubs also have grooves for Gear shaft forks to move the wheels in the frame. The gear shaft fork is mounted on the wheel in the frame, when the shaft is movable. On wheels with Disc webs the Hub (fig. 6) has a Dial web featuring guide for built-together wheels. The inner Dial web has usually two diametrically opposite 4 mm holes (for secondary gears), and one hole (for primary gear). Sub axles (slightly earings).

[illegible]

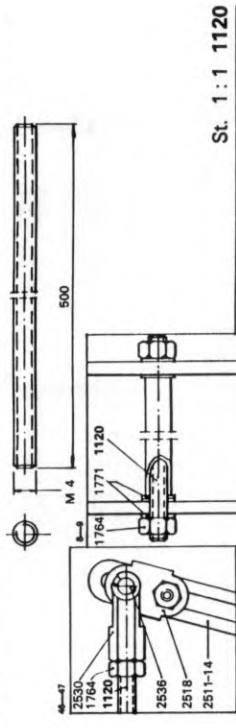
MOTECU. Les éléments de roation ont été conçus en un matériau composite, les deux faces sont en aluminium et les différents dispositifs de moyeux qui sont caractérisés par des gorges disposées diamétralement sur les deux faces du moyeu, sont en acier. Les moyeux sont conçus pour être montés sur des arbres par l'accomplissement des clavettes, ce qui assure par l'accomplissement des clavettes entre elles via des anneaux d'accomplissement pour former des "paquets de roues" similaires, (fig. 3, 4). Les moyeux sont conçus pour être montés sur des arbres par l'accomplissement des clavettes, ce qui assure par l'accomplissement des clavettes entre elles via des anneaux d'accomplissement pour former des "paquets de roues" similaires, (fig. 3, 4). Les moyeux sont conçus pour être montés sur des arbres par l'accomplissement des clavettes, ce qui assure par l'accomplissement des clavettes entre elles via des anneaux d'accomplissement pour former des "paquets de roues" similaires, (fig. 3, 4).



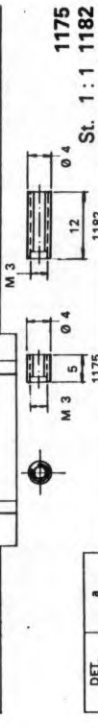
St 1:1 1003-40



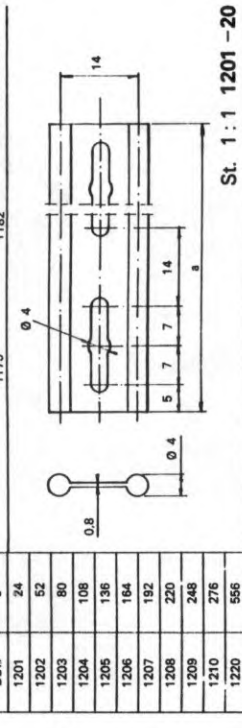
St 1.1 1101 -10



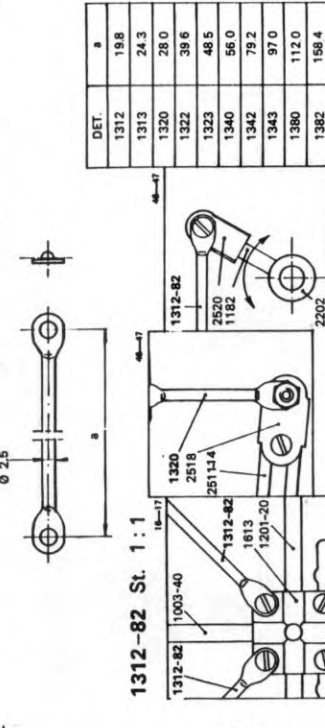
St. 1:1 1120

1182
1183

4 1170
C+ 1.1 1182



St 1:1 1201 -20

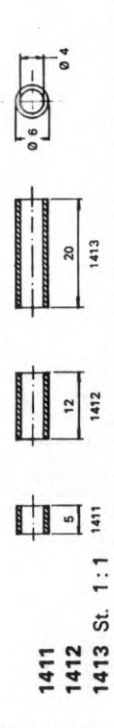


1312-82 St 1:1

1312-82 St 1:1

140A

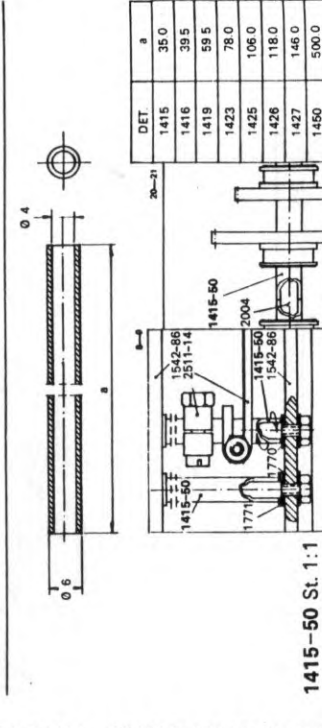
1404 C+ 1:1



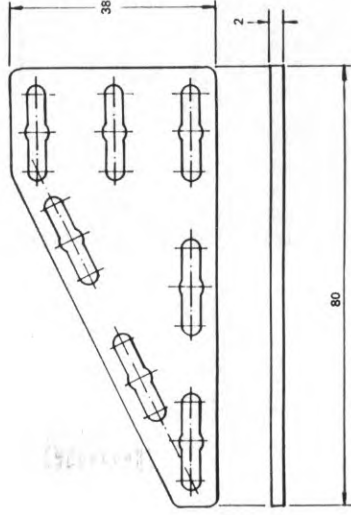
1411

1492

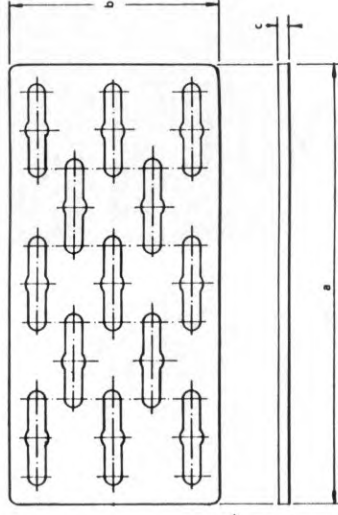
1413 St 1:1



1415-50 St 1.1

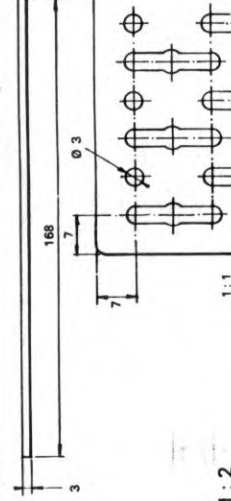
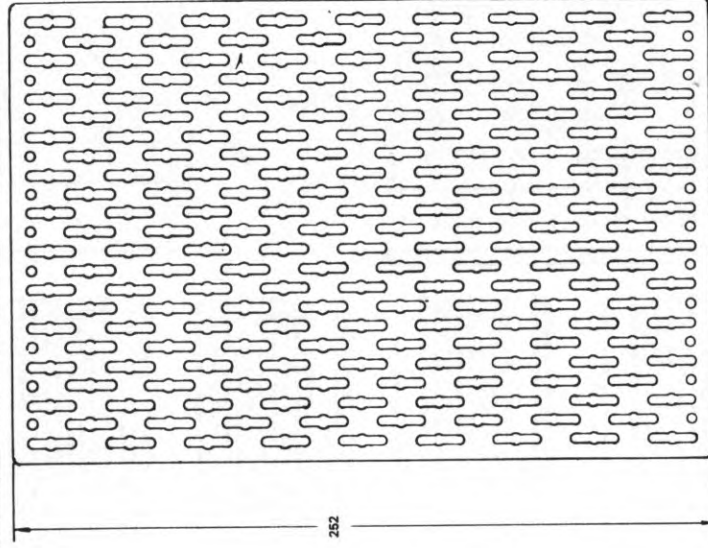


Al. 1:1 1520

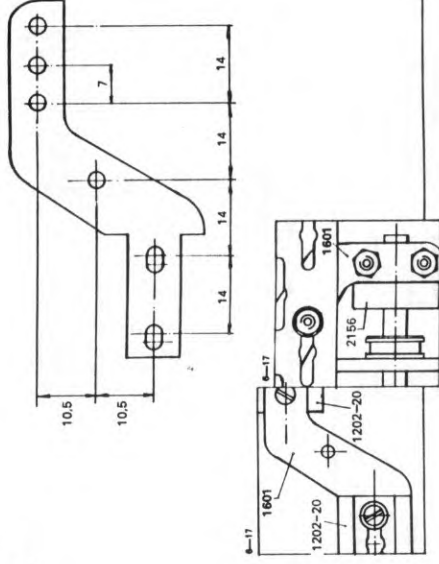


DET.	a	b	c
1521	80	38	2
1531	108	66	2
1541	136	38	3
1542	136	80	3
1544	136	136	3

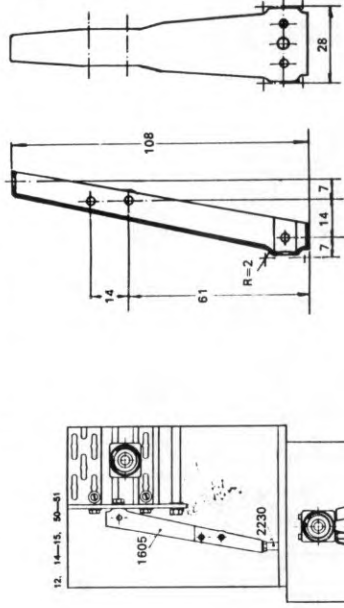
Al. 1:1 1521-44



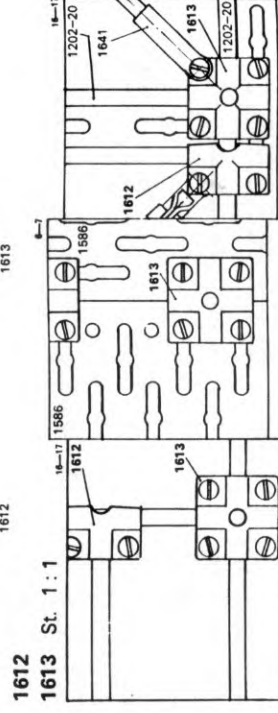
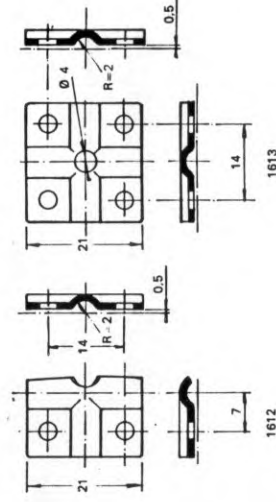
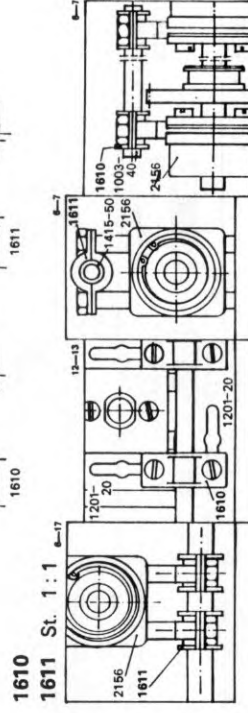
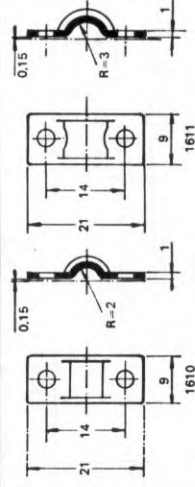
1586 Al. 1:2

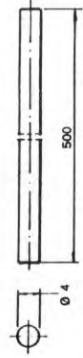


St. 1:1 1601



St. 1:2 1605





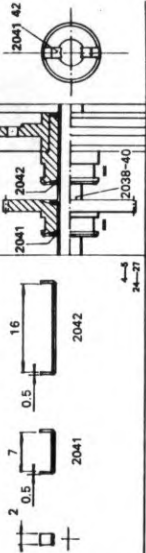
2004 St. 1:1



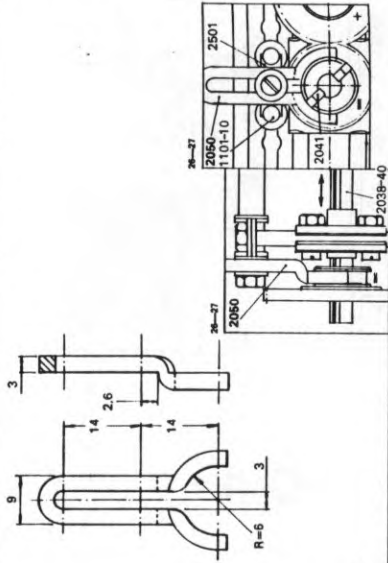
2006-15 St. 1:1



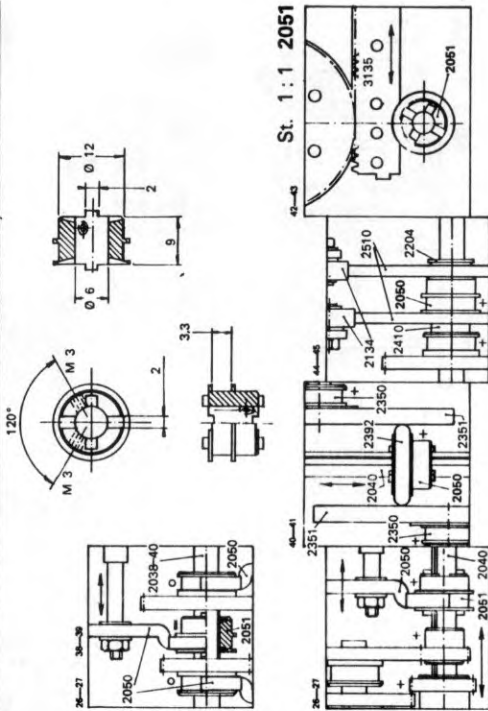
2038-40 St. 1:1



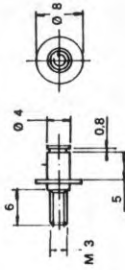
2041
2042 St. 1:1



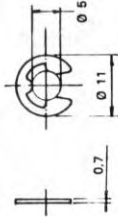
2050 St. 1:1



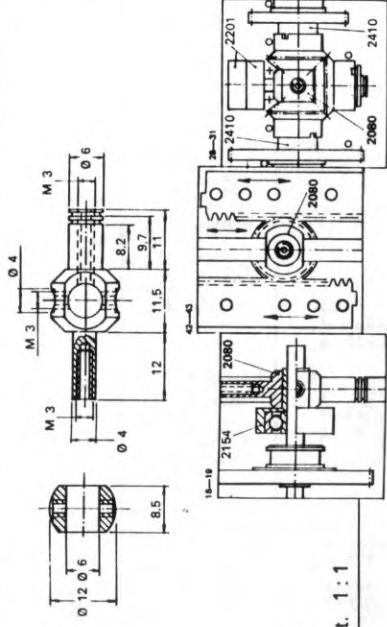
St. 1:1 2061



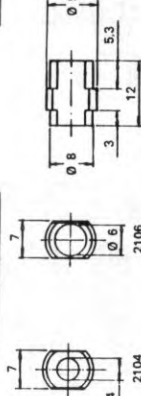
St. 1:1 2070



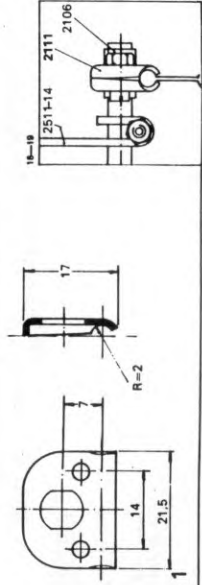
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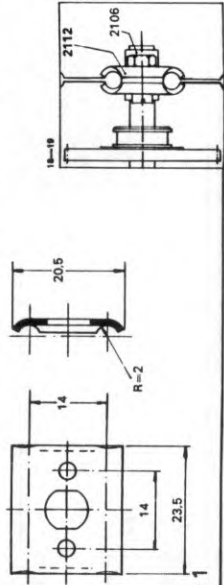
2080 St. 1:1



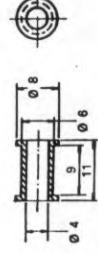
2104
2106 Br. 1:1



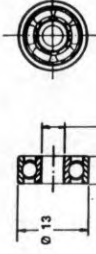
2111 St. 1:1



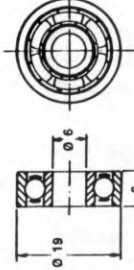
2112 St. 1:1



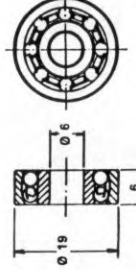
Br. 1:1 2124



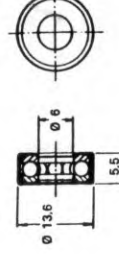
St. 1:1 2134



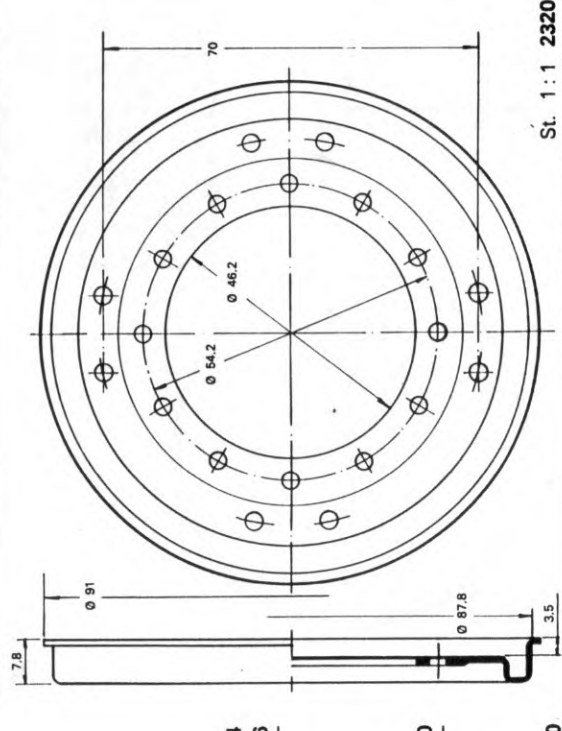
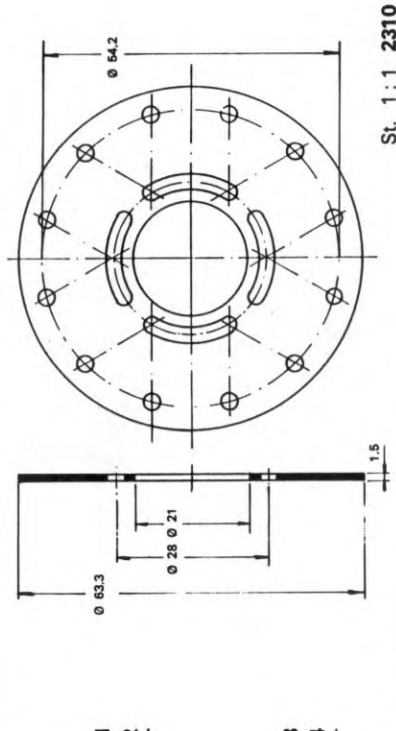
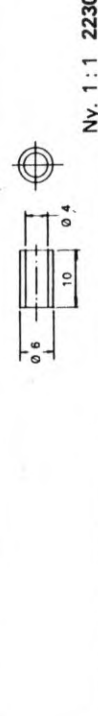
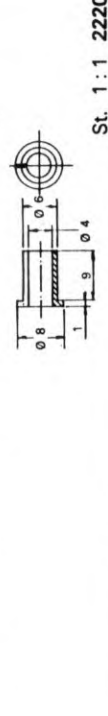
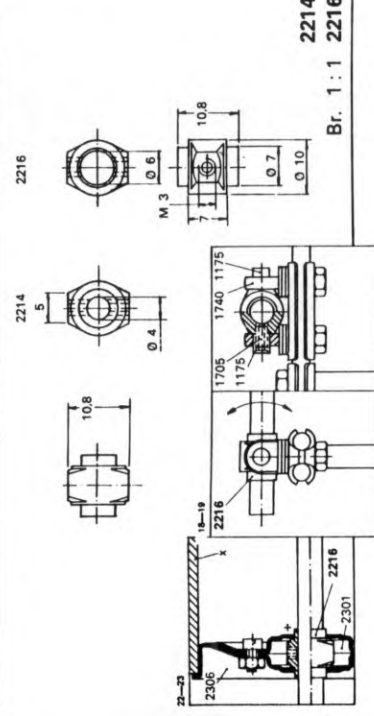
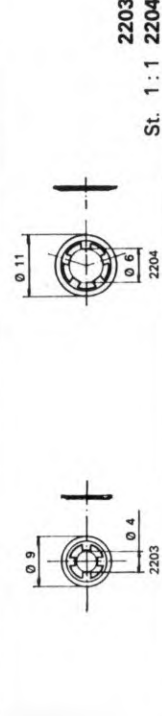
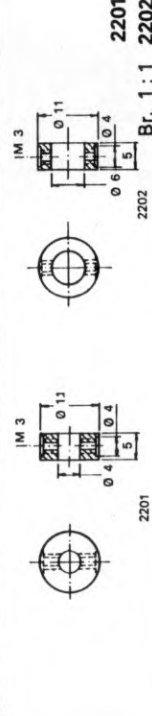
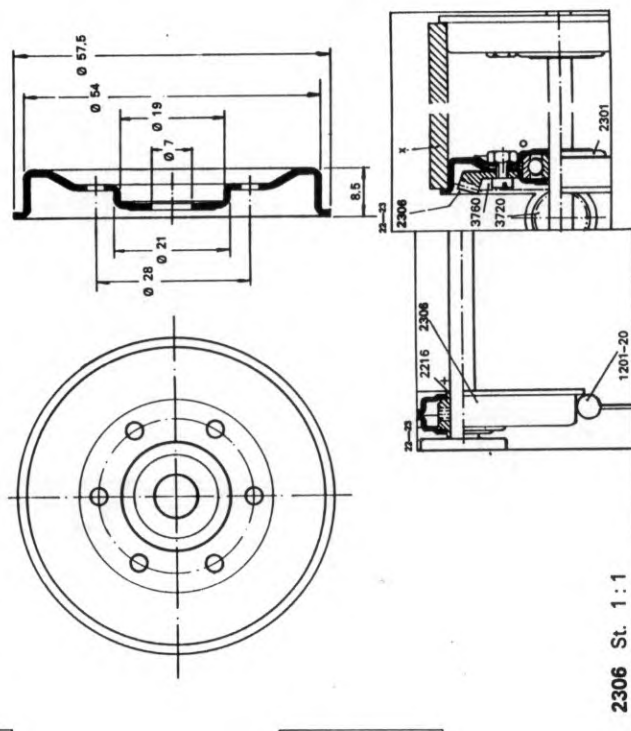
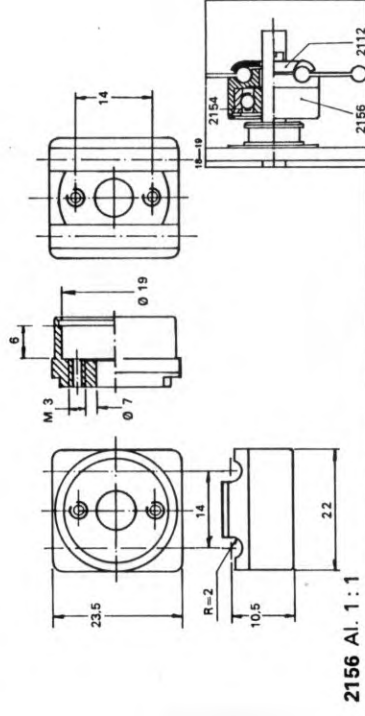
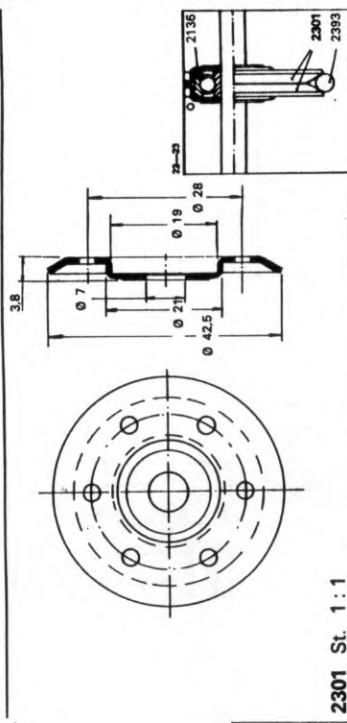
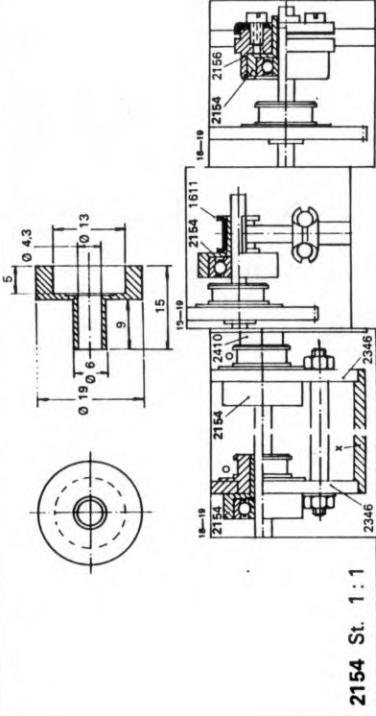
St. 1:1 2136

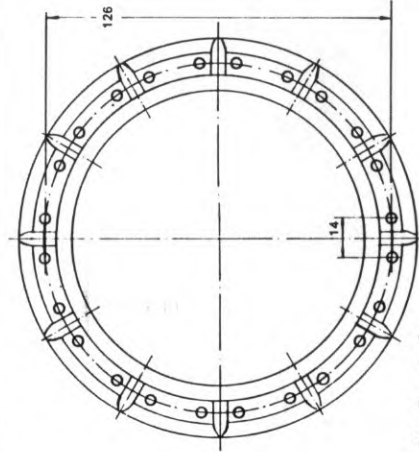


St. 1:1 2137

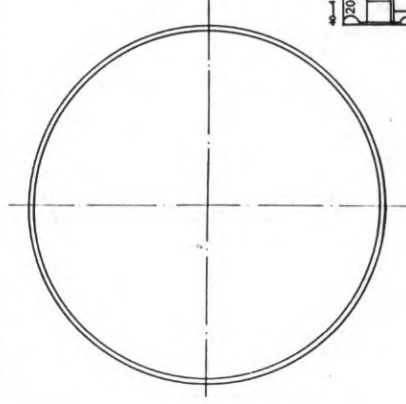
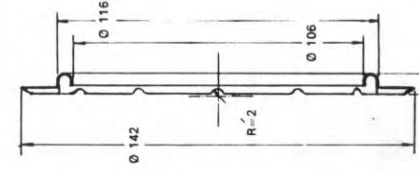


St. 1:1 2138

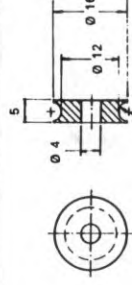
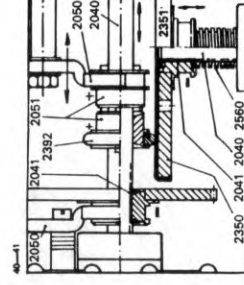




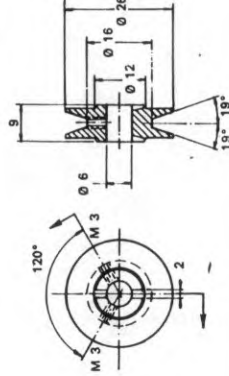
2330 St. 1:2



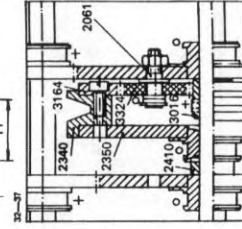
2351 St. 1:1



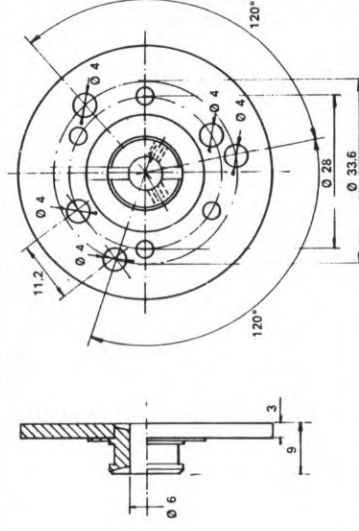
2361 Br. 1:1



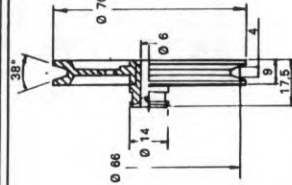
2362 St. 1:1



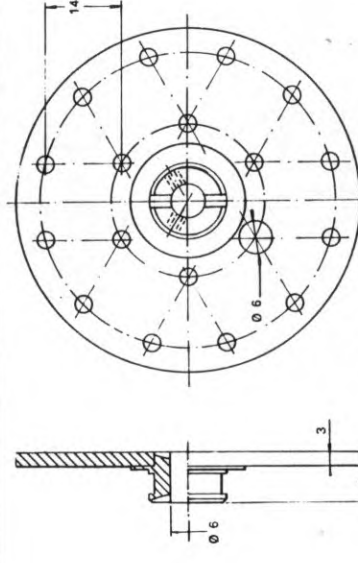
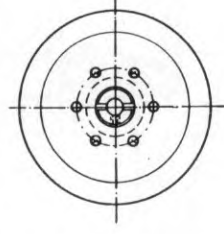
2340 St. 1:1



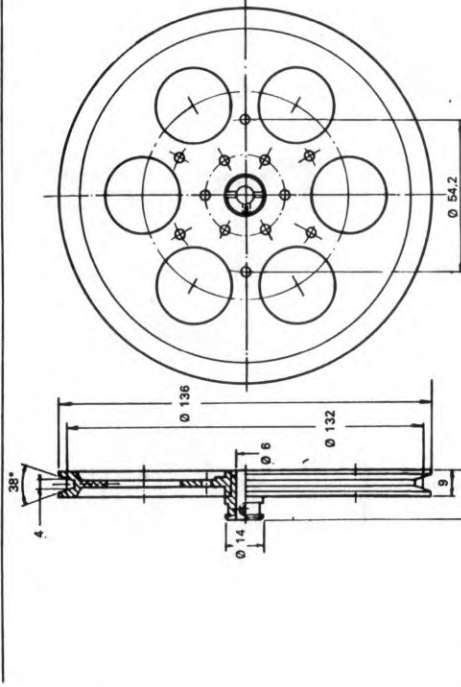
St. 1:1 2346



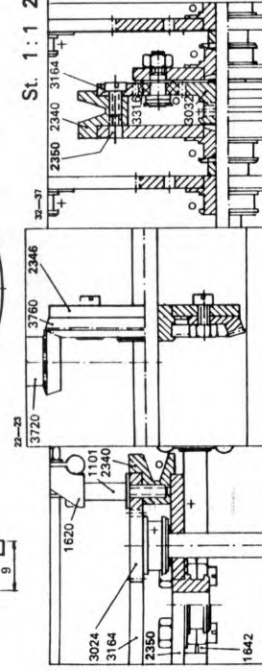
Al. 1:2 2365

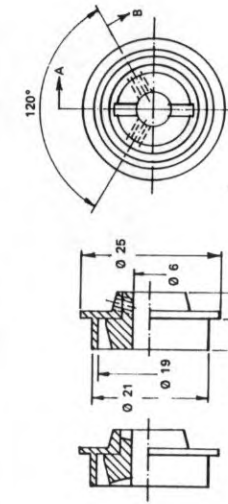
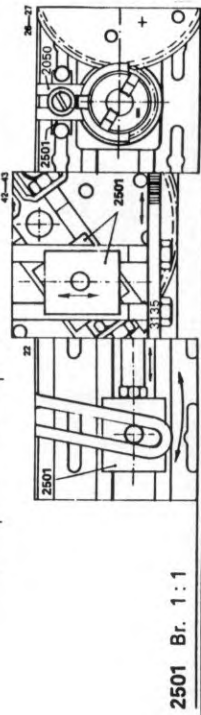
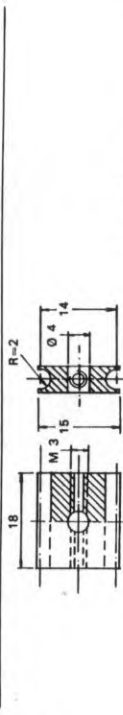
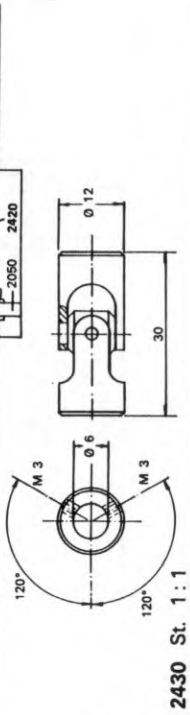
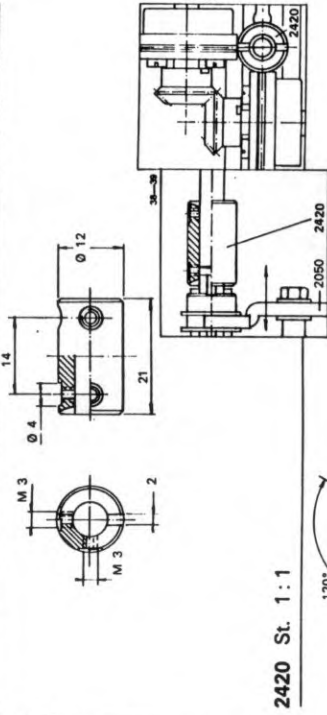
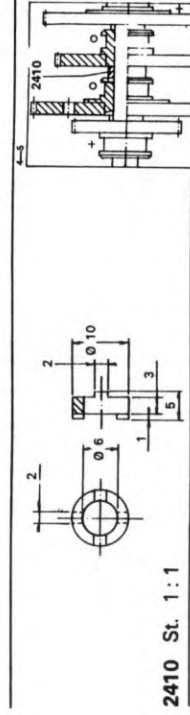
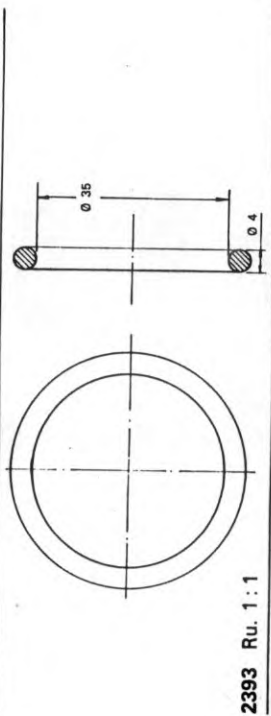
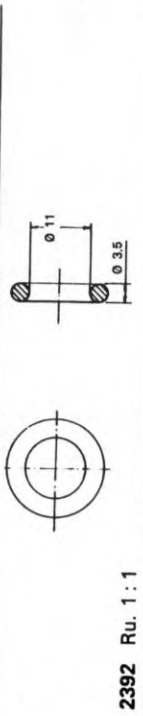
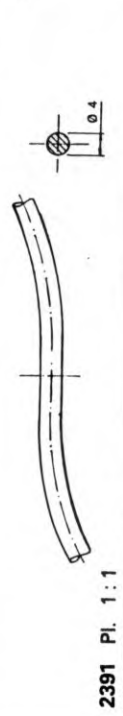
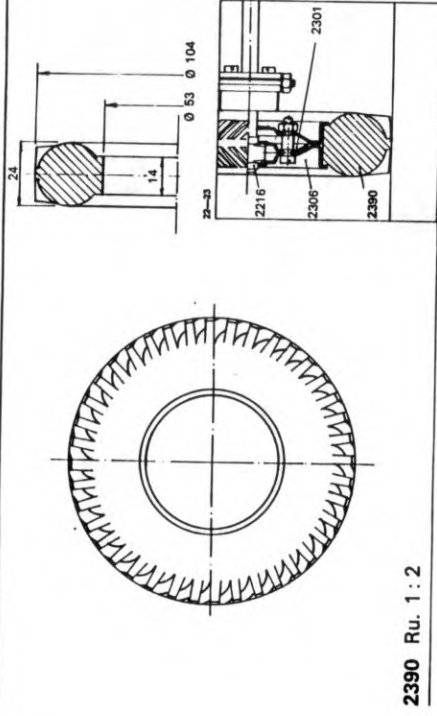


St. 1:1 2350

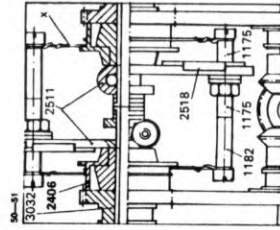
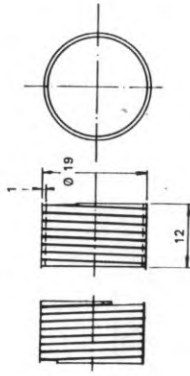


Al. 1:2 2366

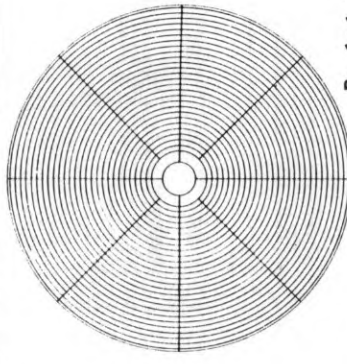
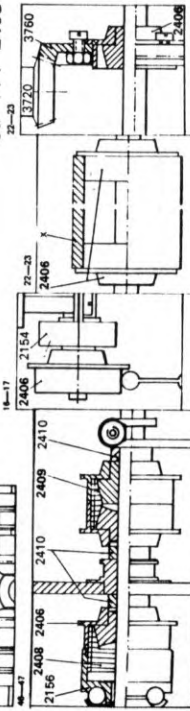




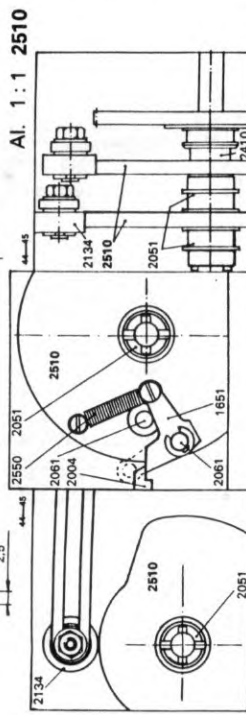
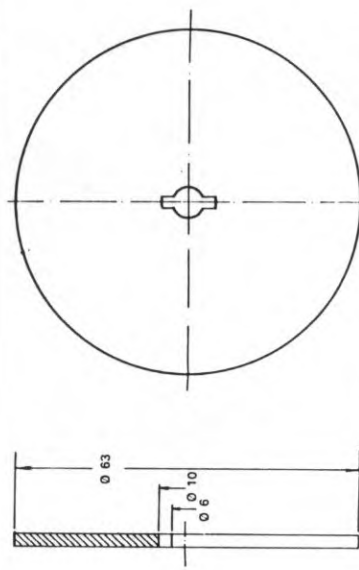
St. 1:1 2406

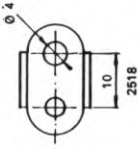
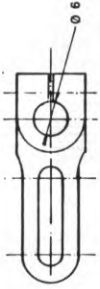
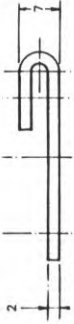
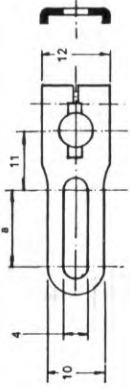


2409 St. 1:1 2408



Pa. 1:1 2509

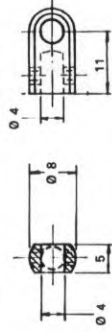
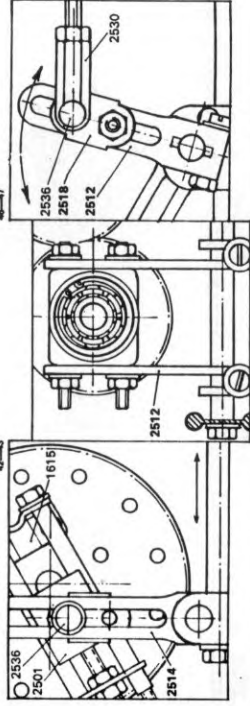




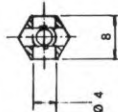
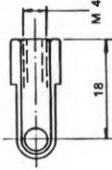
DET.	n
2511	14
2512	28,0
2511	42
2514	56

2511 -14

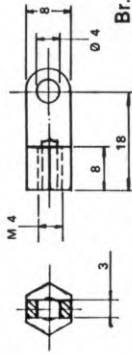
2518 St. 1:1



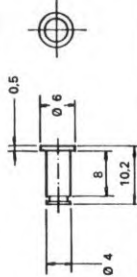
Br. 1:1 2520



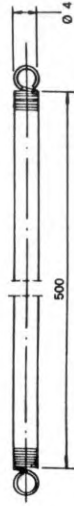
Br. 1:1 2530



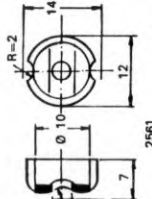
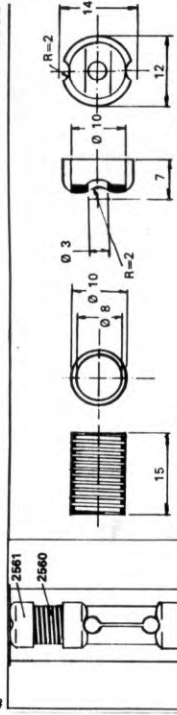
Br. 1:1 2532



St. 1:1 2536

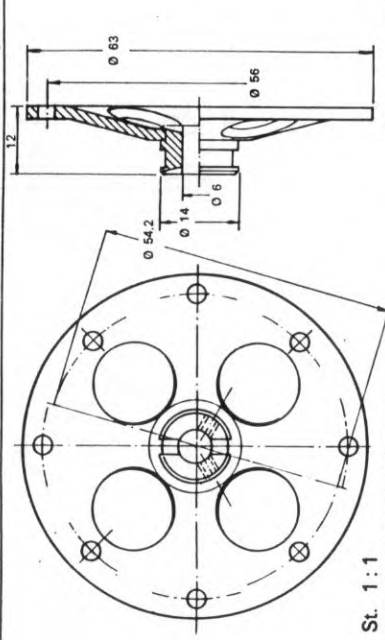


St. 1:1 2550

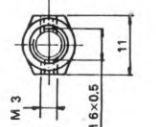
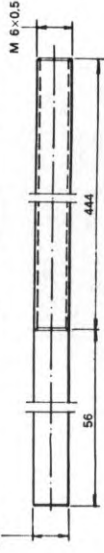
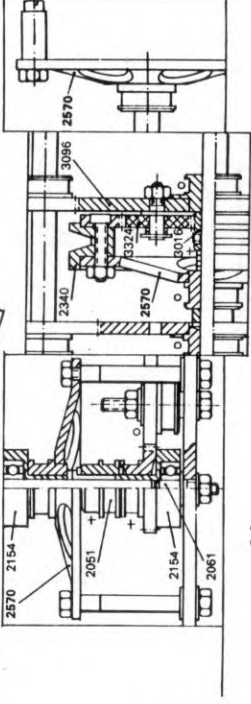


2560

St. 1:1 2561

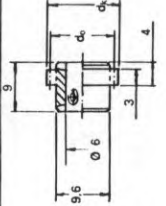


2570 St. 1:1



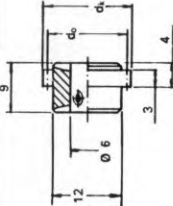
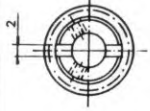
2580 St. 1:1

2581 Br. 1:1



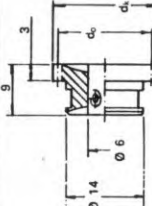
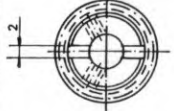
DET.	3016
m	0.7
z	16
d _k	12.6
d _o	11.2

St. 1:1 3016



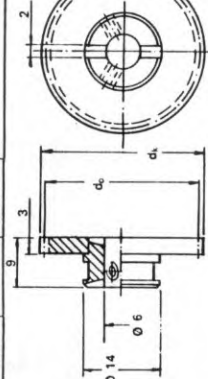
DET.	3020
m	0.7
z	20
d _k	15.4
d _c	14.0

St. 1:1 3020



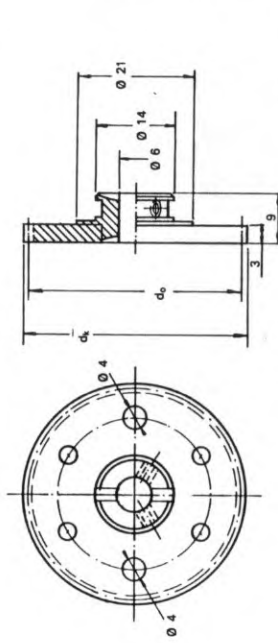
DET.	3024	3028	3032	3036
m	0.7	0.7	0.7	0.7
z	24	28	32	36
d_k	18.2	21.0	23.8	26.6
d_o	16.8	19.6	22.4	25.2

St. 1:1 3024-36



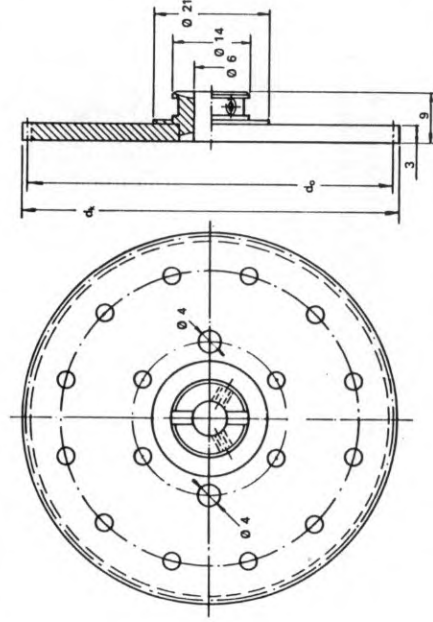
DET.	3040	3044	3048	3052
m	0.7	0.7	0.7	0.7
z	40	44	48	52
d_k	29.4	32.2	35.0	37.8
d_o	28.0	30.8	33.6	36.4

St. 1:1 3040 -52



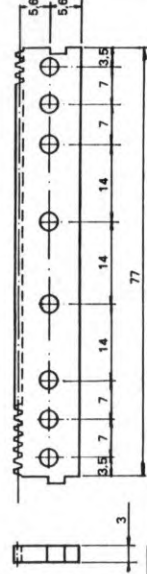
DET.	3056	3064	3072	3080
m	0.7	0.7	0.7	0.7
z	56	64	72	80
d _h	40.6	46.2	51.8	57.4
d _o	39.2	44.8	50.4	56.0

3056-80 St. 1:1



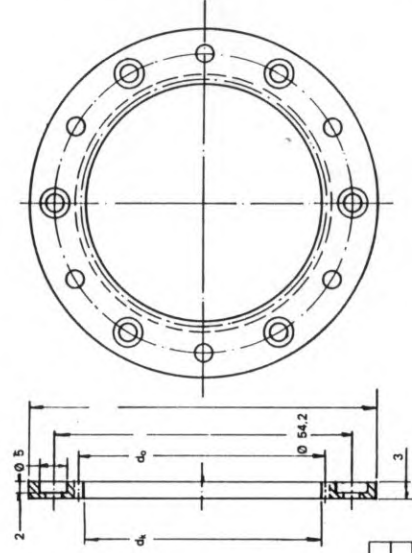
DET.	3096
m	0.7
z	96
d _k	68.6
d _o	67.2

3096 St. 1:1



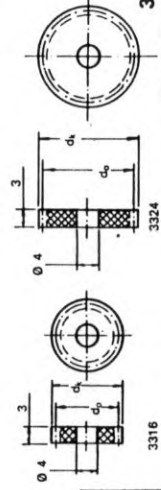
DET.	3135
m	0.7
z	35

St. 1:1 3135



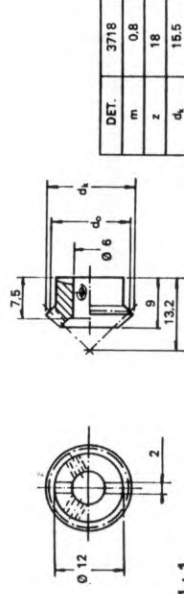
DET.	3164
m	0,7
z	64
d_k	43,4
d_c	44,8

St. 1:1 3164



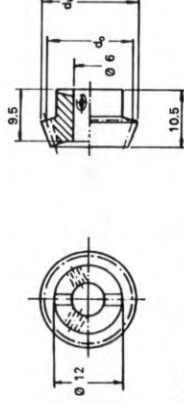
DET.	3316	3324
m	0.7	0.7
z	16	24
d _k	126	182
d _o	112	168

3316
La. 1:1 3324



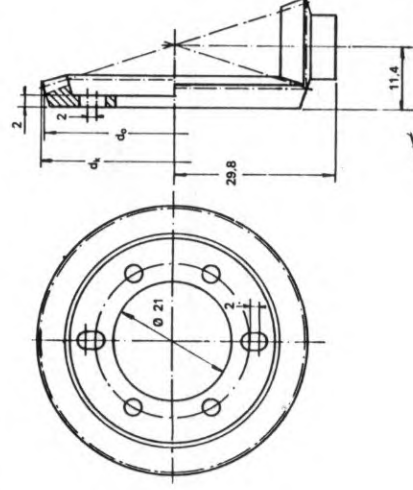
DET.	3718
m	0.8
z	18
d_k	15.5
d_0	14.4

3718 St. 1:1



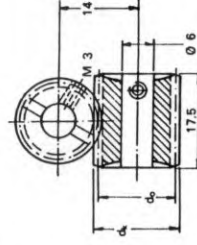
DET.	3720
m	0.8
z	20
d _k	17.52
d ₀	16.00

3720 St. 1:1



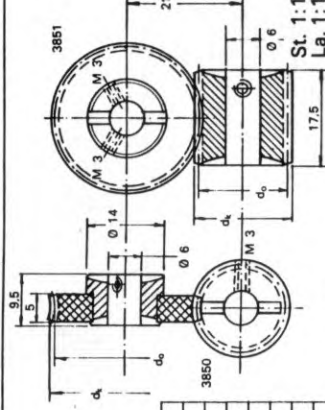
DET.	3760
m	0.8
z	60
d_k	48.5
d_0	48.0

3760 Br. 1:1



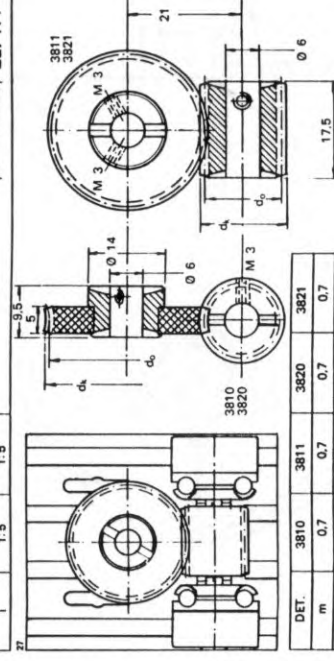
DET.	3801
m	0.7
z	14
d _k	15.4
d _o	14
α	20
a	14
i	1:1

St. 1:1 3801



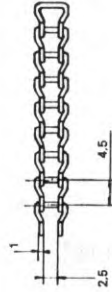
DET.	3850	3851
m	0.7	0.7
z	7	35
d _h	17.72	27.80
d _o	16.32	25.68
α	20°	20°
θ	21	21
	1.5	1.5

St. 1:1 3850
La. 1:1 3851

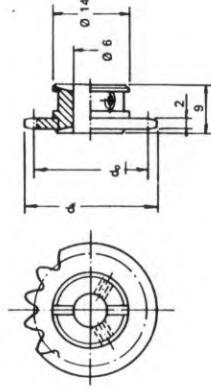


DET.	3810	3811	3820	3821
m	0.7	0.7	0.7	0.7
z	4	40	2	40
d ₀	15.4	29.4	15.4	29.4
d ₁	14.0	28.0	14.0	28.0
α	20°	20°	20°	20°
a	21	21	21	21
i	1.10	1.10	1.20	1.20

St. 1:1 3810
La. 1:1 3811
St. 1:1 3820
La. 1:1 3821

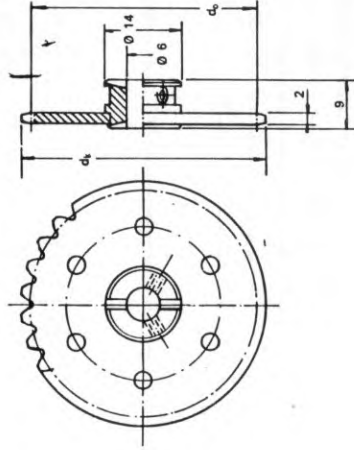


3980 St. 1 : 1



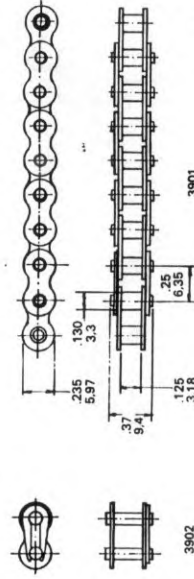
DET.	3984
P	4.5
z	14
d _h	24.0
d _b	20.6

3984 St. 1 : 1

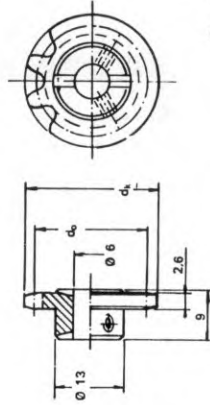


DET.	3988
P	4.5
z	28
d _h	44.6
d _b	41.2

3988 St. 1 : 1

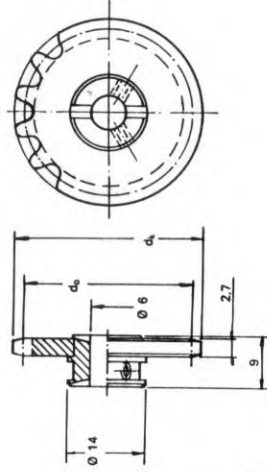


3901
3902 St. 1 : 1 3902



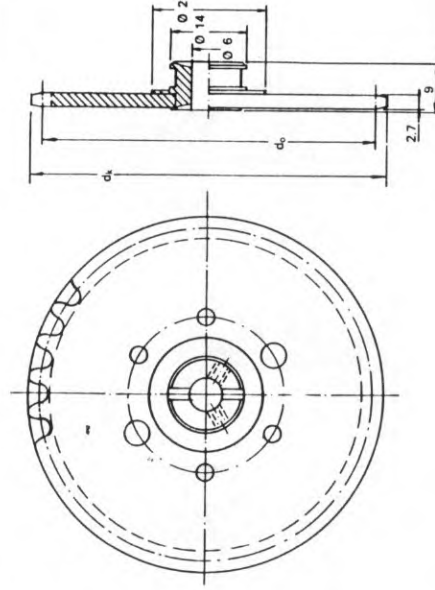
DET.	3910
P	25
z	10
d _h	24.38
d _b	20.55

3910 St. 1 : 1 3910



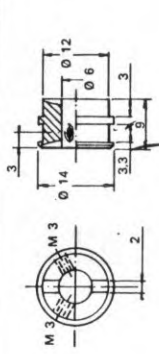
DET.	3915
P	25
z	15
d _h	34.29
d _b	30.53

3915 St. 1 : 1 3915

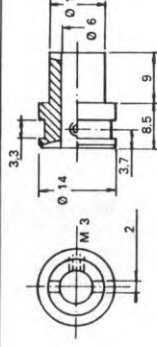


DET.	3930
P	6.35
z	30
d _h	63.54
d _b	60.76

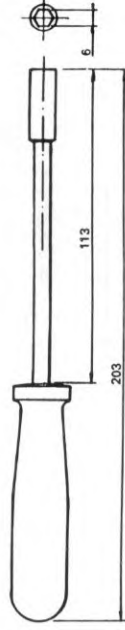
3930 St. 1 : 1



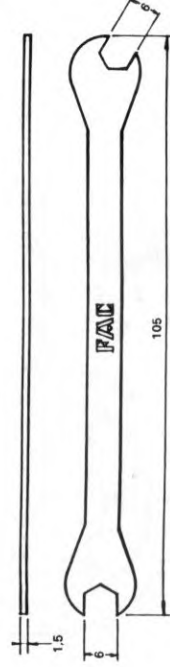
4000 St. 1 : 1



4001 Br. 1 : 1



3901 St. 1 : 1 0801



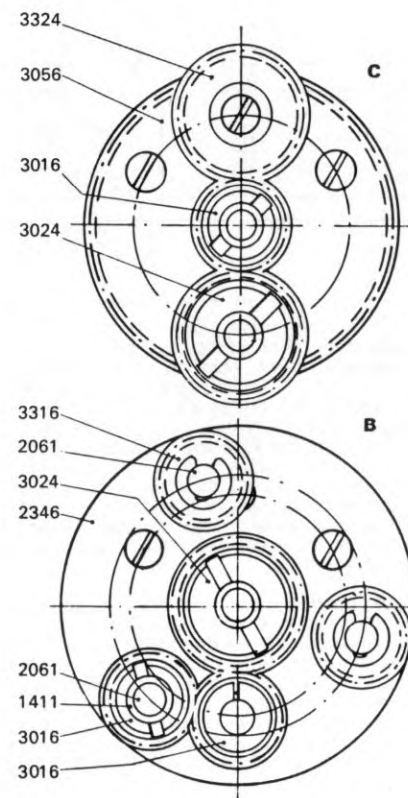
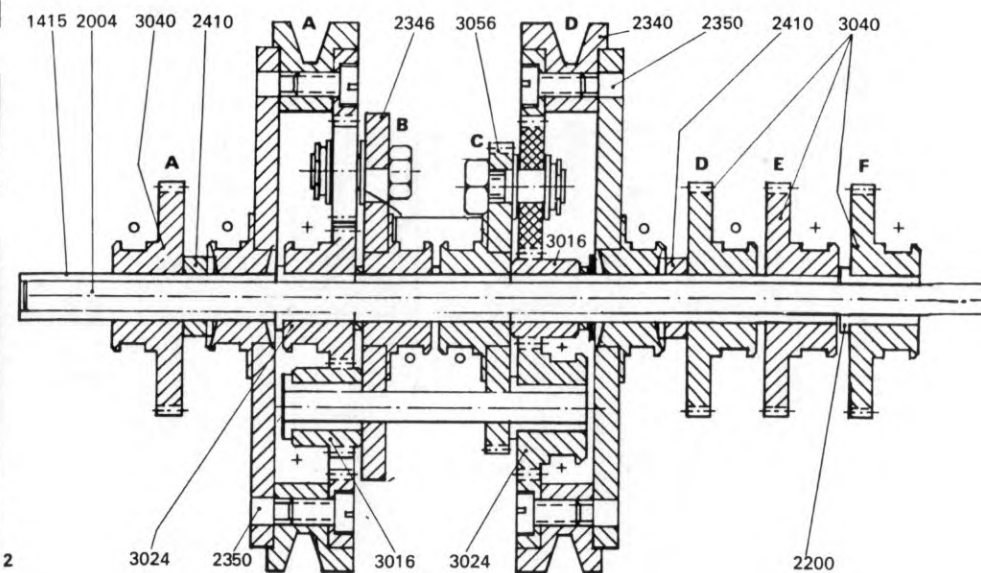
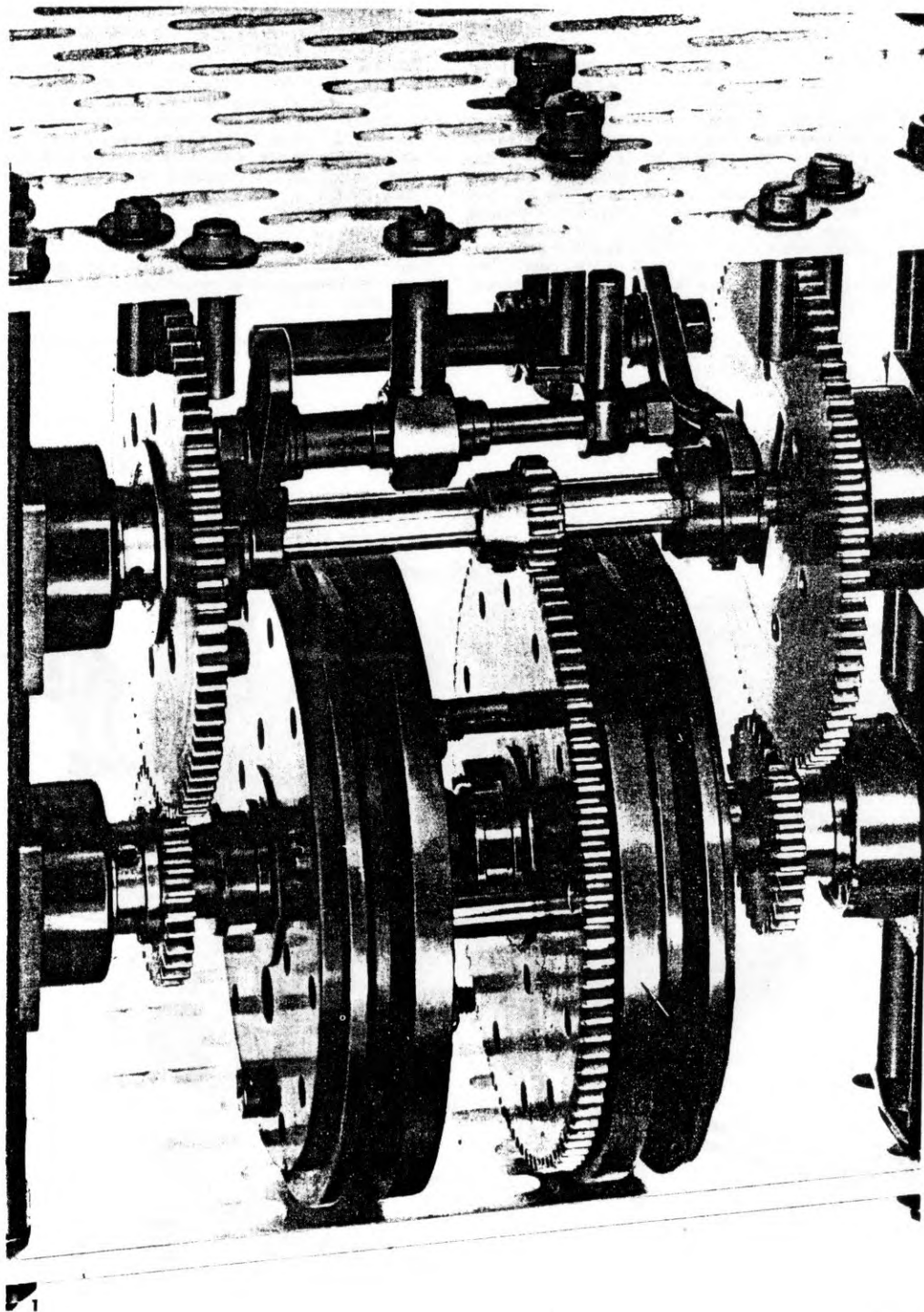
3902 St. 1 : 1 0802



3903 St. 1 : 1 0803



3904 St. 1 : 1 0804



DOUBLE PLANETARY GEARS

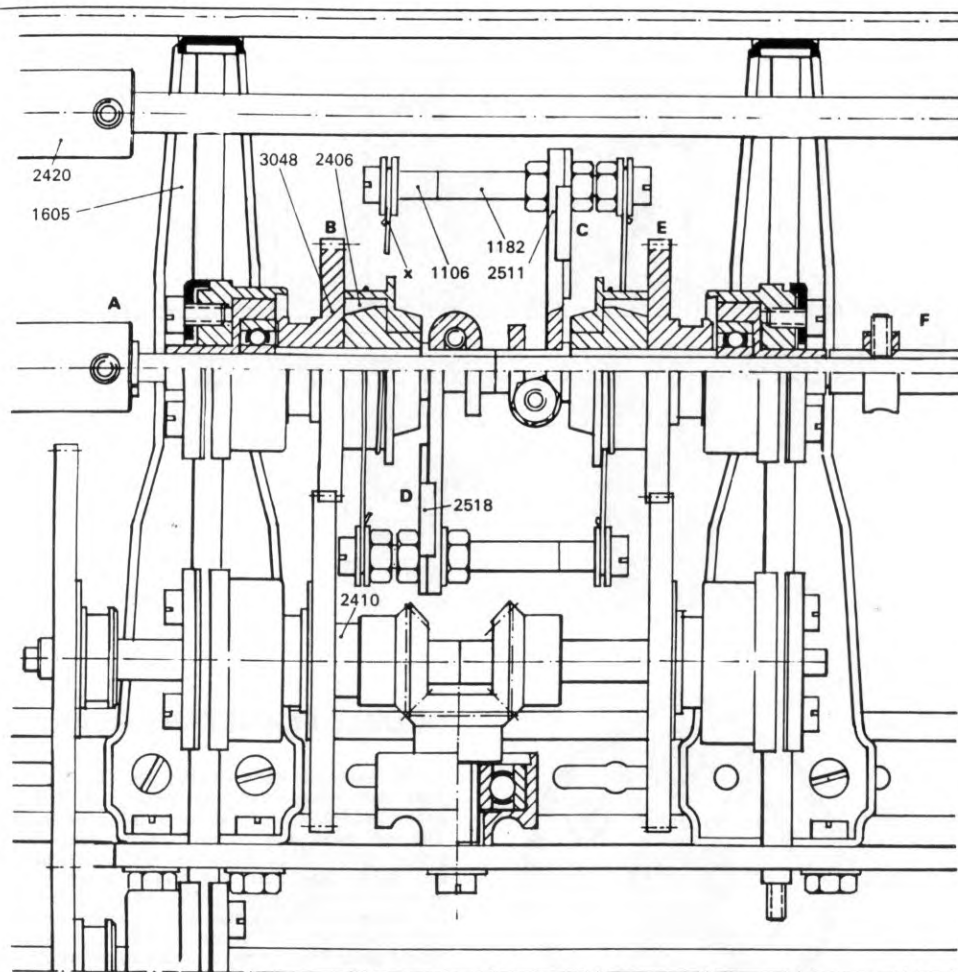
In the example here described, the right hand gear unit comprises sun gear 3016 and planet gears 3024 and 3324 (fabric-reinforced bakelite). The left hand unit comprises sun gear 3024 and planet gears 3316 (fabric-reinforced bakelite) and 3016. Sun gear and planet gears are connected via spur gear 3016, which is located on the shaft combining the two planetary gear units and continues the drive to the right hand unit planet gear 3024 located on the same shaft, Fig. 3 and 4. The shafts, both input and output, are given the letters A, B, C, D, E and F. Gear A is connected with the left hand gear ring by means of a tube shaft and coupling rings. Sun gear 3024 in this unit is connected with gear F via the 4-mm. through shaft. Planet wheel discs BC are located on a tube shaft (spacer tube 1413) journaled on the same shaft, and the right hand unit sun gear D, united with a gear wheel by a coupling ring, is mounted on a tube shaft which connects the sun gear of this unit with gear wheel E.

Ratios

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

E	F	A	BC	D
o	20	30	36	45
20	o	-10	-16	-25
30	10	o	-6	-15
36	16	6	o	-9
45	25	15	9	o

The shaft with the highest ratio of revolutions compared with the output shaft should be chosen as input shaft.



TORQUE BOOSTER

The integrator in Fig. 1 contains a large rotating translucent plastic disc, which drives a friction roller, diametrically movable across the disc surface. The roller is controlled by lead screw 2580, which guides a sliding unit of corner plates 1520 along a fixed 6-mm. shaft 2015. Gear shift fork 2050 continues the movement to the friction roller consisting of a spur gear 3024 fitted with a plastic disc; disc and roller are both specially made components. The sharp edge of the roller disc travels against the cushioned main disc. To ensure that the force transmitted to the roller by the friction against the main disc is sufficient to drive other mechanisms (other integrators, etc.), it must be increased by means of a torque booster, the construction of which is described in Fig. 2. Input shaft A connects with output shaft F at the centre of the torque booster. Rocker arms 2511 are located on the shaft tips and fitted with wire clamps, as il-

lustrated. Both shafts must be carried in two bearings. Input shaft A is journaled at the other end of the unit (not visible) and the bearings for the output shaft are shown in Fig. 1. Behind wire clamps C and D, drums (composed of parts 3048 and 2406) are freely mounted on the shafts and driven directly by the motor, in opposed directions, at a speed exceeding the maximum speeds of shafts A and F. Wires run between the clamps and are wound once, in different directions, round their respective drum.

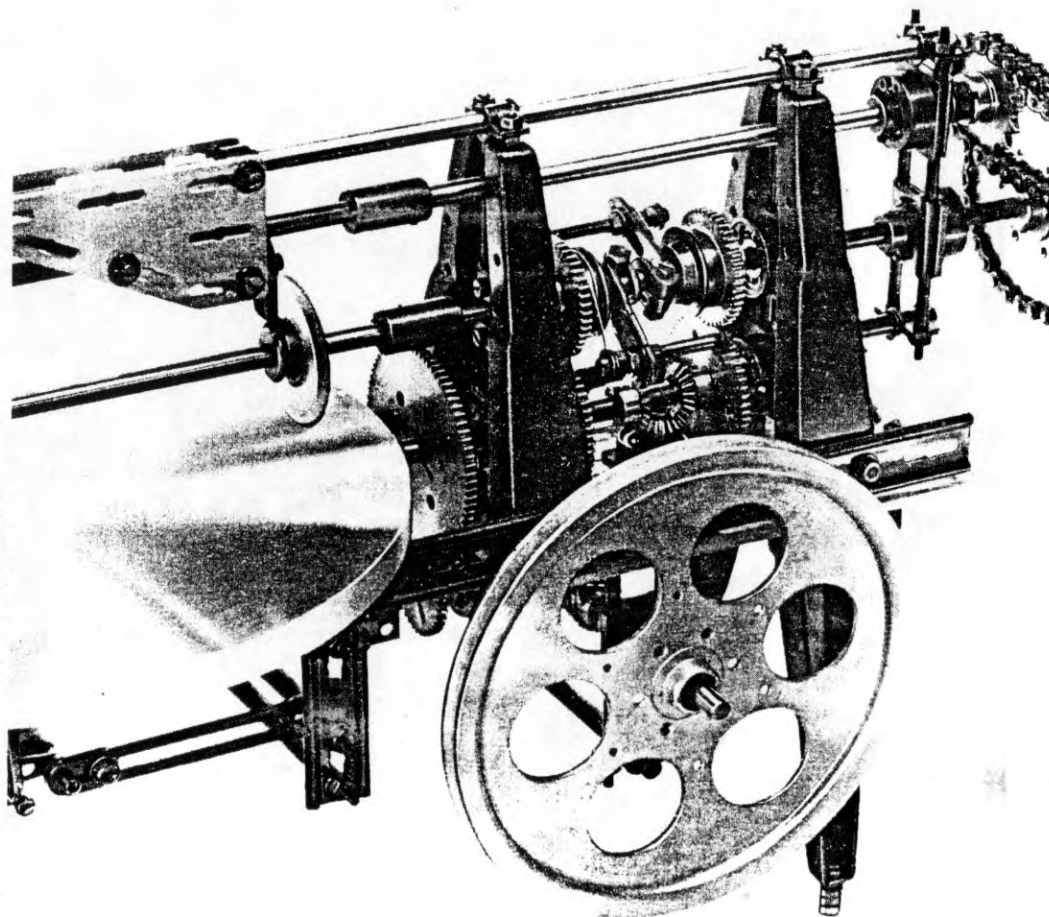
When shaft A turns, the wire wound in that direction tightens round its drum, which turns correspondingly pulling along the wire and thus also the other wire clamp located on the output shaft. When shaft A turns in the other direction, the process is repeated, but centered on the drum turning in the opposite direction. This mechanism will thus supply additional driving force without affecting established transmission ratios.

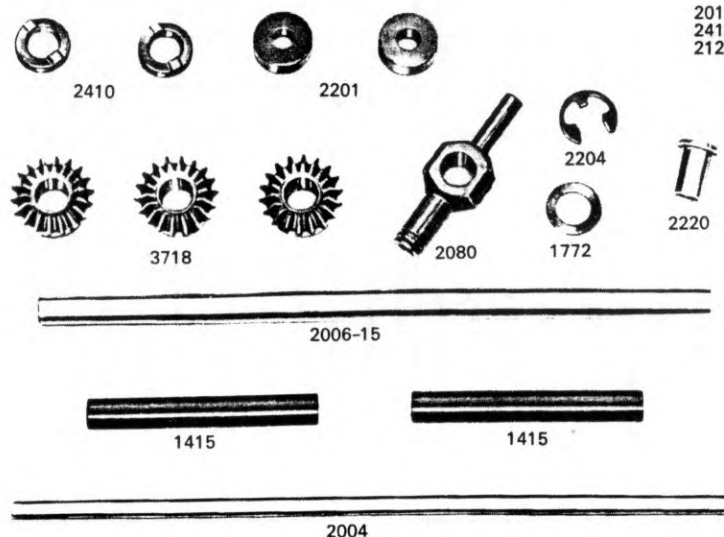
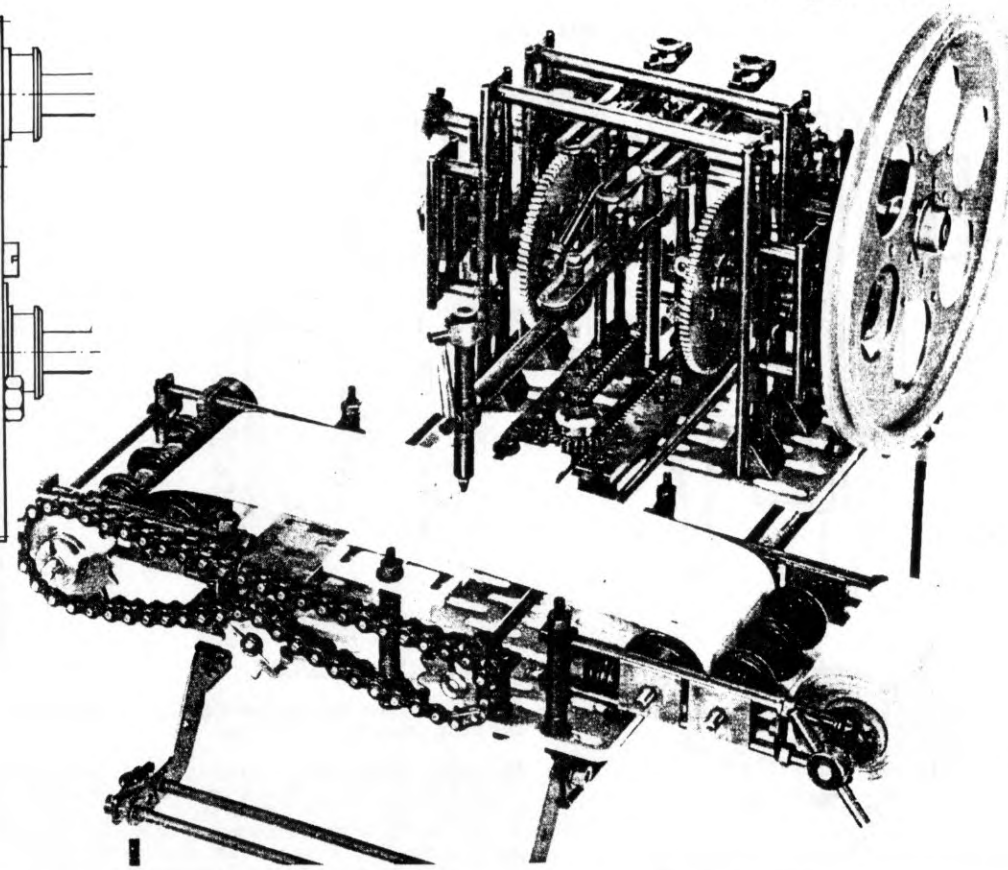
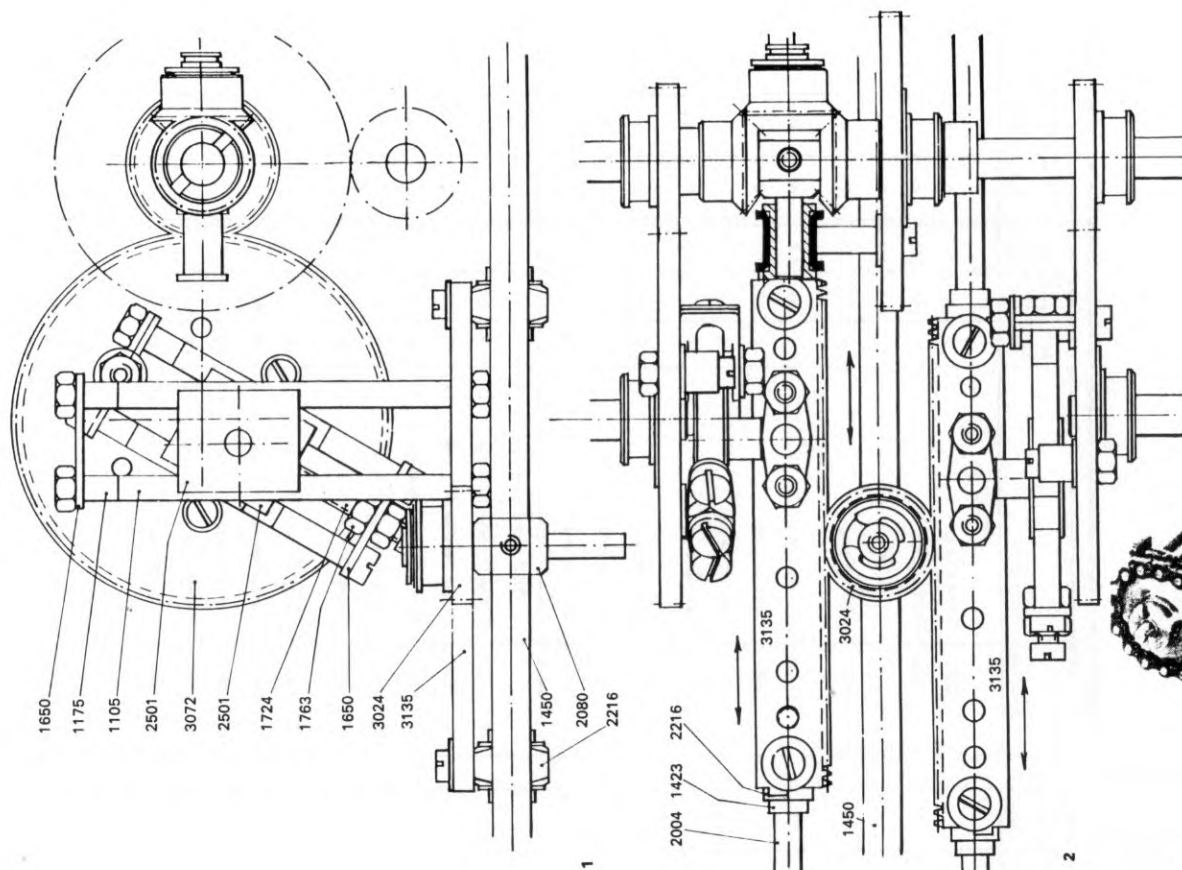
RACKS. COMPOSITE LINEAR MOVEMENT

The example shown in Fig. 3 above is a device which records a diagram on a moving cross-ruled paper strip, the speed of which is adjusted to that of the complex reciprocating movement of the scriber. Two cranks with adjustable throw continue the movement via sliding shaft heads to two opposed racks, both of which are in mesh with a gear located between them. This gear is carried by an axially guided rod to which the scriber is attached. The relative speeds of the cranks can be altered by changing the gear ratios. The basically simple gearing is made more complex by means of a differential, and the movement cycle is extended. This device can be used to test an unlimited number of reciprocating movement combinations.

Fig. 1 and 2 show the construction of the cranks and how the racks and the gear moving between them are arranged. The drive is transmitted by a gear attached to the differential centre. The differential gear shafts (tubes and 4-mm. shafts) pass to one side of the unit (compare differential construction according to Fig. 6, page 29), where they carry exchangeable gears which are in mesh with corresponding gears mounted on a gear plate (not shown).

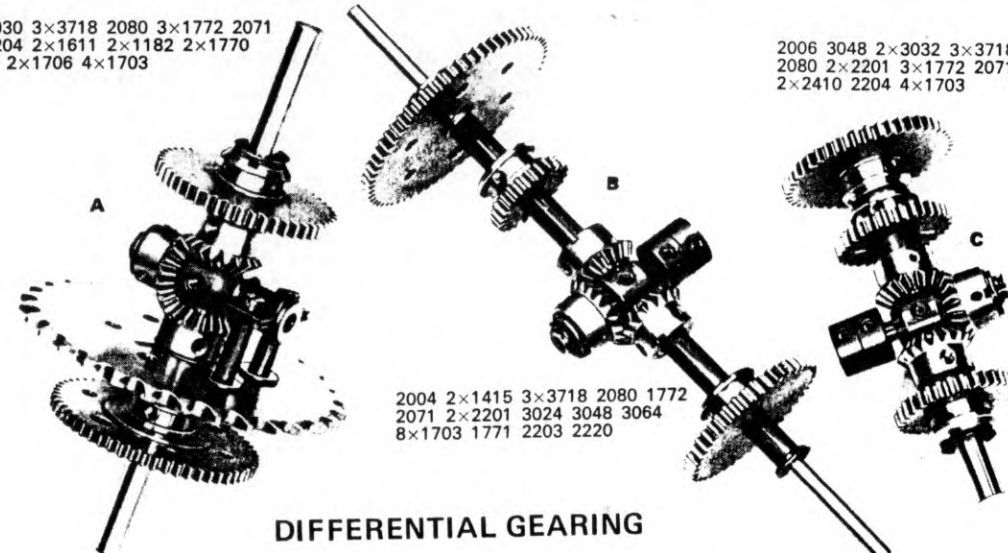
A device for composite linear movement, as in the present example, can be called a "linear differential" with two input movements, and one output movement constituting the arithmetic mean of the two former.





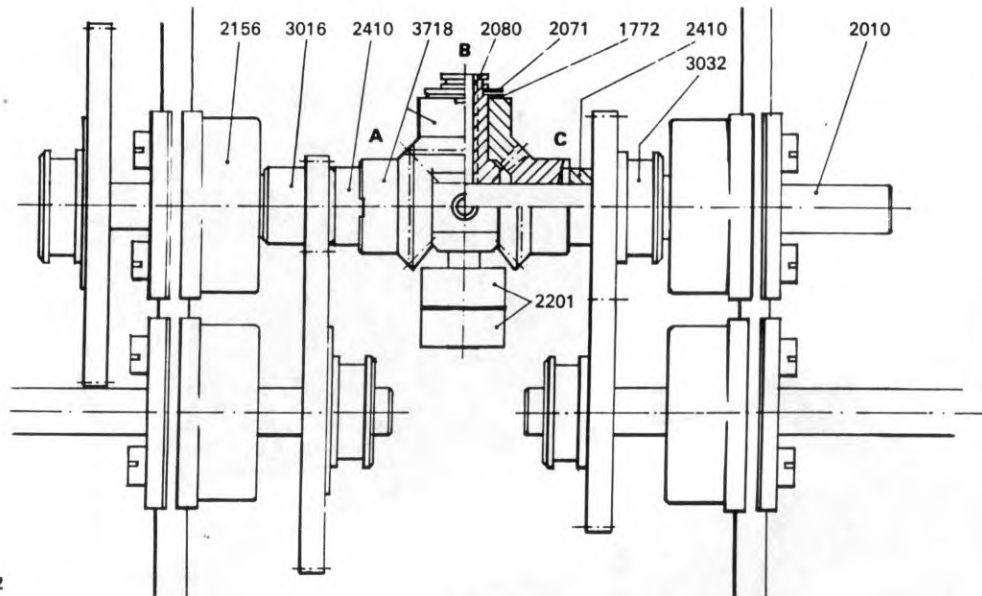
2010 3056 3930 3×3718 2080 3×1772 2071
 2410 3048 2204 2×1611 2×1182 2×1770
 2124 2×1710 2×1706 4×1703

2006 3048 2×3032 3×3718
 2080 2×2201 3×1772 2071
 2×2410 2204 4×1703



2004 2×1415 3×3718 2080 1772
 2071 2×2201 3024 3048 3064
 8×1703 1771 2203 2220

DIFFERENTIAL GEARING



DIFFERENTIAL GEARING

Fig. 1 illustrates three types of differential gearing and their principal components.

Differential centre 2080, carrying the planet wheel on its 6-mm. stub axle, can be mounted on either a 6-mm. shaft or, by fitting split sleeve 2220, a 4-mm. shaft; it can be balanced by means of retaining rings 2201. When a 6-mm. shaft is employed, the various components of the mechanism, of which the differential forms a part, are driven by the differential gears via coupling rings and gears, Fig. 2, 3 and 1C. When fitting a 4-mm. shaft, the differential gears are mounted on hollow shafts which can pass through bearings as in Fig. 1B. The differential centre can also be connected directly to a perforated wheel, mounted on the shaft, by means of coupling pins, Fig. 1A. These examples are also illustrated by drawings 2-5. Fig. 6, finally, shows a mechanism characterised by the fact that both the in-put and out-put movements are located on the same side of the differential centre. The differential has a wide range of application and can be employed in various automatic systems. Compare Fig. 1, page 8, Fig. 1 and 2, page 42, and Fig. 1-3, pages 48 and 49.

In Fig. 3-6 the arrows point to gears that are coupled together.

Ratios

The differential gears are indicated by A and B and the differential centre by C. Locked gear is indicated by 0 and reversed movement by -. The adjacent table gives the ratios.

	A	B	C
0	1	2	
1	0	-1	
2	1	0	

Part No.	Description	Qty per Pkt	Price		Contents per FAC Kit		
			Per Pkt	Per Part	Std	Struc	Gear
1201	24 mm long	8	13/6	1/11	-	8	-
1202	52 mm long	8	14/0	2/0	4	8	-
1203	80 mm long	8	15/0	2/0	8	8	-
1204	108 mm long	8	17/0	2/3	8	8	-
1205	136 mm long	4	9/9	2/6	4	4	-
1206	164 mm long	4	10/0	2/9	2	4	-
1207	192 mm long	4	10/9	2/10	-	4	-
1208	220 mm long	4	11/0	2/11	2	4	-
1209	248 mm long	4	13/0	3/4	2	4	-
1210	276 mm long	2	7/10	4/2	-	4	-
1218	500 mm long	2	12/0	6/6	2	4	-
1312	TIE RODS 2.5 mm dia.	15	4/3	-	-	10	-
1313	Fixing Centres 19.8 mm	15	4/3	-	-	10	-
1320	Fixing Centres 24.3 mm	15	4/6	-	-	10	-
1322	Fixing Centres 28.0 mm	15	4/10	-	-	10	-
1323	Fixing Centres 39.6 mm	15	5/3	-	-	10	-
1340	Fixing Centres 48.5 mm	15	5/6	-	-	10	-
1342	Fixing Centres 56.0 mm	15	6/2	-	-	10	-
1343	Fixing Centres 79.2 mm	15	6/5	-	-	10	-
1380	Fixing Centres 97.0 mm	15	6/8	-	-	10	-
1382	Fixing Centres 112.0 mm	15	7/6	-	-	10	-

* NEW OR IMPROVED PARTS

Part No.	Description	Qty per Pkt	Price		Contents per FAC Kit		
			Per Pkt	Per Part	Std	Struc	Gear
1003	38 mm long	10	2/9	-	10	10	-
1004	52 mm long	10	3/0	-	-	20	-
1005	66 mm long	10	3/6	-	-	20	-
1006	80 mm long	10	4/-	-	10	20	10
1007	94 mm long	10	4/3	-	-	20	10
1008	108 mm long	10	4/5	-	-	20	10
1010	136 mm long	10	5/6	-	10	10	5
1040	500 mm long	10	15/9	1/8	2	10	2
1101	THREADED RODS	25	13/0	8	20	20	-
1102	30 mm total length	25	14/0	9	20	20	-
1103	40 mm total length	20	13/0	10	20	20	-
1104	50 mm total length	20	14/6	11	20	20	-
1105	60 mm total length	20	15/6	1/0	20	20	-
1106	70 mm total length	20	17/0	1/0	20	20	-
1107	80 mm total length	10	9/6	1/1	20	20	-
1108	90 mm total length	20	21/0	1/3	10	20	10
1110	98.4 mm total length	10	11/3	1/4	10	20	10
1120	126.4 mm total length	1	4/9	-	1	4	-
1175	FULL THREADED ROD	50	10/6	-	100	100	50
1182	500 mm long	50	18/6	-	100	100	50
1175	TAPPED SLEEVES	50	10/6	-	100	100	50
1182	5 mm long	50	18/6	-	100	100	50

* NEW OR IMPROVED PARTS

Part No.	Description	Qty Per Pkt	Price			Contents per FAC Kit		
			Per Pkt	Per Pkt	Per Pkt	Std	Struc	Gear
100	1404							
	DISTANCE RINGS							
	d = 4 mm D = 6 mm	50	4/0	-		50	~~100~~	50
1406	d = 6 mm D = 8 mm	50	5/3	-		50	-	100
25	1411	25	4/3	-		20	40	-
	SPACER TUBES							
	5 mm long	10	2/4	-		10	20	-
1412	12 mm long	10	3/3	-		10	20	-
1413	20 mm long	10	3/3	-		10	20	-
	HOLLOW SHAFTS							
* 1415	35 mm long	10	8/6	1/0		-	20	10
* 1416	39.5 mm long	10	10/9	1/2		10	20	-
* 1419	59.5 mm long	10	12/9	1/4		10	20	10
* 1423	78.0 mm long	10	15/6	1/9		10	20	10
10	* 1425	10	19/0	2/1		5	20	-
10	* 1426	5	9/9	2/1		5	-	-
10	* 1427	5	12/0	2/7		5	-	5
4	1450	1	8/6	-		1	4	2
	PLATES							
* 1520	Corner Plate	2	5/1	2/8		2	4	-
* 1521	80 mm x 38 mm x 2 mm	2	8/0	4/3		2	4	-
* 1531	108 mm x 66 mm x 2 mm	2	12/0	6/3		2	4	-
* 1541	136 mm x 38 mm x 3 mm	2	8/6	4/6		2	4	-
* 1542	136 mm x 80 mm x 3 mm	2	16/0	8/0		2	4	2
* 1544	136 mm x 136 mm x 3 mm	2	18/6	10/0		2	2	2
* 1586	Baseplate	2	57/0	30/0		2	2	-
1601	Cranked Plate	4	5/9	-		4	8	-
* 1605	Support Leg	4	25/6	6/9		4	4	-

Part No.	Description	Qty Per Pkt	Price			Contents per FAC Kit		
			Per Pkt	Per Pkt	Per Pkt	Std	Struc	Gear
25	* 1764	25	2/2	-		20	20	10
	Hex. nut for M4 screw							
1770	Plain washer 3 mm I.D.	50	1/10	-		200	400	50
100	* 1771	100	2/2	-		50	~~100~~	50
	Plain washer 4 mm I.D.							
* 1772	Plain washer 6 mm I.D.	50	2/2	-		50	-	50
* 1775	Spring washer for M3 screw	100	2/2	-		100	200	-
	SHAFTS							
2004	4 mm dia. 500 mm long	1	4/6	-		1	-	2
* 2006	6 mm dia. 60 mm long	1	1/10	-		1	-	4
* 2008	6 mm dia. 80 mm long	1	2/2	-		1	-	4
* 2010	6 mm dia. 108 mm long	1	2/5	-		1	-	4
* 2012	6 mm dia. 120 mm long	1	2/8	-		1	-	4
* 2014	6 mm dia. 148 mm long	1	3/6	-		1	-	4
2015	6 mm dia. 500 mm long	1	7/0	-		1	-	2
* 2038	Grooved for keys 6 mm dia. 60 mm long	2	4/3	2/3		2	-	4
* 2039	Grooved for keys 6 mm dia. 108 mm long	2	5/9	3/0		2	-	4
* 2040	Grooved for keys 6 mm dia. 500 mm long	1	10/0	10/0		1	-	8
	MISCELLANEOUS PARTS							
40	* 2041	40	11/6	-		10	-	20
	Keys for 6 mm shaft 7 mm long							
20	* 2042	20	6/3	-		10	-	20
	Keys for 6 mm shaft 16 mm long							
* 2050	Gear shift fork	4	6/3	1/9		4	-	10
* 2051	Sliding coupling	2	16/3	8/6		2	-	6
10	* 2061	10	6/3	-		50	-	20
	Stub axle							
10	* 2070	10	8	-		50	-	50
	Retaining ring for 4 mm shaft							

Part No.	Description	Qty Per Pkt	Price			Contents per FAC Kit		
			Per Pkt	Per Pkt	Per Pkt	Std	Struc	Gear
25	1610	25	9/9	-		20	40	-
	For 4 mm dia. rod							
25	1611	10	4/0	-		20	40	10
10	1612	20	4/3	-		20	20	-
10	1613	10	2/6	-		10	20	-
1615	"I" type (inner) for 4 mm dia. rod	10	3/6	-		10	20	-
1616	"I" type (outer) for 4 mm dia. rod	10	4/6	-		10	20	-
20	1620	10	8/9	-		30	50	10
	Angular type							
1630	Short clamp	50	11/3	-		50	100	-
* 1631	Long clamp	30	6/6	-		30	60	-
1640	Rod clamp for 4 mm dia. rod	10	4/0	-		10	40	-
1641	End clip for 4 mm dia. rod	10	4/9	-		10	40	-
1642	Joint clip (double)	10	9/3	-		10	20	-
1650	Straight Link plate	10	1/4	-		50	50	10
20	1651	10	2/8	-		10	10	10
	Angle Link plate 90°							
25	1703	25	9/0	-		20	40	-
	SET SCREWS, NUTS AND WASHERS							
25	1705	25	9/0	-		20	40	-
	Allen type 3 mm long							
1706	Cheese head type 6 mm long	100	4/6	-		100	200	100
* 1710	Cheese head type 10 mm long	100	4/9	-		100	200	100
1715	Cheese head type 15 mm long	50	2/8	-		50	100	50
25	1724	25	2/0	-		50	100	50
	Cheese head type 24 mm long							
25	1740	10	6/0	-		20	20	10
	"Eye" head type for 4 mm rod							
250	1763	100	7/3	-		500	1000	300
	Hex. nut for M3 screw							

Part No.	Description	Qty Per Pkt	Price			Contents per FAC Kit		
			Per Pkt	Per Pkt	Per Pkt	Std	Struc	Gear
20	* 2071	10	1/3	-		10	-	50
	Retaining ring for 6 mm shaft							
2080	Differential centre	2	18/6	10/0		2	-	4
2104	Bushing for 4 mm shaft	10	6/3	-		10	-	20
2106	Bushing for 6 mm shaft	10	6/3	-		10	-	20
2111	Single bushing clamp (4 mm shaft)	10	5/3	-		10	-	10
2112	Double bushing clamp (4 mm shaft)	25	13/6	-		25	25	50
2124	Flanged bushing	10	4/6	-		10	-	10
2134	Ball bearing (4 mm shaft)	2	9/0	5/0		2	-	4
2136	Ball bearing (6 mm shaft)	4	12/6	3/6		4	-	6
* 2137	Spherical ball bearing (6 mm shaft)	2	9/0	5/0		2	-	6
* 2138	Axial ball bearing (6 mm shaft)	2	4/0	2/3		2	-	2
2154	Bearing cage for 2134	2	7/6	4/0		2	-	4
2156	Bearing box for 2136 and 2137	6	32/6	6/0		6	-	12
* 2157	Inner locking ring for 2156	10	1/6	-		10	-	20
2201	Retaining ring (4 mm shaft)	10	6/6	-		10	-	20
2202	Retaining ring (6 mm shaft)	10	6/6	-		10	-	20
* 2203	Self locking washer (4 mm shaft)	10	1/6	-		10	-	20
* 2204	Self locking washer (6 mm shaft)	10	1/6	-		10	-	20
2214	Shaft head (4 mm shaft)	10	9/3	-		10	-	10
2216	Shaft head (6 mm shaft)	10	9/3	-		10	-	10
2220	Split sleeve	10	10/-	-		10	-	10
2230	Nylon insert sleeve	10	8/6	-		10	10	10
2301	Wheel disc 42.5 mm dia.	4	3/3	-		8	-	8
2306	Wheel disc 57.5 mm dia.	2	4/9	-		2	-	4
2310	Perforated disc 63.3 mm dia.	2	3/9	-		2	-	4

Part No.	Description	Qty per per Pkt	Price			Contents per FAC Kit		
			Per Pkt	Part		Std	Struc	Gear
2320	Flanged rim 91 mm dia.	2	8/9	-		2	-	2
~~2320~~	~~Connectors wheel 142 mm dia.~~	1	7/3	-		2	2	2
* 2340	Flywheel ring 70 mm dia.	1	29/6	-		1	-	2
* 2346	Planet wheel disc	2	14/6	7/6		2	-	4
* 2350	Perforated wheel 63.2 mm dia.	2	21/6	11/6		2	-	4
* 2351	Friction disc 65.3 mm dia.	2	5/3	2/9		2	-	2
2361	Loose pulley (4 mm shaft)	4	4/-	-		4	-	8
* 2362	Pulley 26 mm dia. (6 mm shaft)	1	7/9	-		1	-	2
* 2365	Pulley 70 mm dia. (6 mm shaft)	1	23/0	-		1	-	1
* 2368	Pulley 136 mm dia. (6 mm shaft)	1	33/6	-		1	-	1
~~2369~~	~~Rubber tyre 104 mm dia.~~	1	6/6	-				
* 2391	Plastic cord 4 mm dia.	1m	1/6	-		1m	-	1m
* 2392	O-ring 11 mm I.D.	4	3/6	-		4	-	4
* 2393	O-ring 35 mm I.D.	2	3/9	-		2	-	4
* 2406	Free wheel housing	2	19/10	-		2	-	4
* 2408	Expansion spring - right	1	2/0	-		1	-	2
* 2409	Expansion spring - left	1	2/0	-		1	-	2
* 2410	Coupling ring	5	10/6	2/3		5	-	10
* 2420	Shaft sleeve	1	7/6	-		1	-	2
* 2430	Universal coupling	2	32/-	17/0		2	-	2
6	2501 Sliding crosshead	4	12/0	3/3		4	-	4
~~2502~~	~~Cam plate~~	2	2/3	1/3		2	-	2
* 2510	Cam disc material (aluminium)	2	6/9	-		2	-	4
* 2511	Rocker arm 14 mm centres	2	6/9	3/6		2	-	4
* 2512	Rocker arm 28 mm centres	2	7/3	4/0		2	-	4

Part No.	Description	Qty per per Pkt	Price			Contents per FAC Kit		
			Per Pkt	Part		Std	Struc	Gear
* 2513	Rocker arm 42 mm centres	2	7/9	4/3		2	-	4
* 2514	Rocker arm 56 mm centres	2	8/6	4/6		2	-	4
16	* 2518 Lock plate (for rocker arms)	8	6/6	10		8	-	8
2520	Connecting rod end (4 mm shaft)	2	4/3	-		2	-	4
* 2530	Fork head (4 mm shaft)	2	6/9	3/9		2	-	4
* 2532	Tongue head	2	6/9	3/9		2	-	4
* 2536	Flanged connecting pin (4 mm)	4	2/0	-		4	-	8
2550	Tension Spring 500 mm long	2	3/0	-		1	-	1
2560	Thrust spring 15 mm long	5	3/6	-		5	-	10
2561	Spring seat	10	9/6	-		10	-	20
* 2570	Handwheel 63 mm dia.	1	8/0	-		1	-	2
17	2580 Lead screw M6 x 500 mm long	1	25/0	-		1	-	2
2583	Lead nut for 2580	2	3/6	-		2	-	4
* 3016	Spur gear 16 teeth (6 mm shaft)	4	20/0	5/3		2	-	4
* 3020	Spur gear 20 teeth (6 mm shaft)	4	22/0	6/0		1	-	6
* 3024	Spur gear 24 teeth (6 mm shaft)	4	26/0	7/6		2	-	4
* 3028	Spur gear 28 teeth (6 mm shaft)	4	27/6	7/6		1	-	4
* 3032	Spur gear 32 teeth (6 mm shaft)	4	29/6	8/0		2	-	4
* 3036	Spur gear 36 teeth (6 mm shaft)	4	33/0	8/6		1	-	2
* 3040	Spur gear 40 teeth (6 mm shaft)	4	35/0	9/6		1	-	2
* 3044	Spur gear 44 teeth (6 mm shaft)	4	37/0	9/9		1	-	2
* 3048	Spur gear 48 teeth (6 mm shaft)	4	39/0	10/6		2	-	4
* 3052	Spur gear 52 teeth (6 mm shaft)	4	41/0	11/0		1	-	2
* 3056	Spur gear 56 teeth (6 mm shaft)	4	44/0	12/0		1	-	2

*NEW OR IMPROVED PARTS

Part No.	Description	Qty per per Pkt	Price			Contents per FAC Kit		
			Per Pkt	Part		Std	Struc	Gear
* 3064	Spur gear 64 teeth (6 mm shaft)	2	23/6	12/6		2	-	2
* 3072	Spur gear 72 teeth (6 mm shaft)	2	26/0	13/6		1	-	2
* 3080	Spur gear 80 teeth (6 mm shaft)	2	27/6	14/6		2	-	3
* 3096	Spur gear 96 teeth (6 mm shaft)	2	30/0	16/0		1	-	2
3135	Toothed rack 35 teeth	2	38/6	20/0		2	-	2
* 3164	Gear ring (internal) 64 teeth	2	39/6	21/0		1	-	2
* 3216	Spur gear 16 teeth (4 mm shaft)	3	13/3	5/0		3	-	3
* 3316	Planet gear 16 teeth (4 mm shaft)	3	9/6	3/9		3	-	6
* 3324	Planet gear 24 teeth (4 mm shaft)	2	6/9	3/9		2	-	4
* 3718	Bevel gear 18 teeth 1:1	5	39/6	8/6		5	-	8
* 3720	Bevel gear 20 teeth 1:3	2	20/6	11/6		2	-	3
3760	Bevel Wheel 60 teeth 1:3	1	19/6	-		1	-	2
* 3801	Worm 1:1 (Paired)	2	32/0	-		2	-	2
* 3810	Worm 1:10	1	17/6	-		-	-	1
* 3811	Wormwheel 1:10	1	16/6	-		-	-	1
* 3820	Worm 1:20	1	17/6	-		1	-	1
* 3821	Wormwheel 1:20	1	16/6	-		1	-	1
* 3850	Worm 1:5	1	17/6	-		-	-	1
* 3851	Wormwheel 1:5	1	16/6	-		-	-	1
* 3901	1/4" Roller chain 500 mm long	1	19/0	-		1	-	1
* 3902	Roller chain joint	1	1/9	-		2	-	3
* 3910	Chain sprocket 10 teeth	2	19/0	10/6		1	-	2
* 3915	Chain sprocket 15 teeth	2	24/6	13/6		-	-	2
* 3930	Chain sprocket 30 teeth	2	31/6	16/6		1	-	2

Part No.	Description	Qty per per Pkt	Price			Contents per FAC Kit		
			Per Pkt	Part		Std	Struc	Gear
3980	Wire chain 1 metre long	1	2/0	-		1	-	1
* 3984	Chain sprocket (for 3980) 14 teeth	2	9/6	5/3		2	-	2
* 3998	Chain sprocket (for 3980) 28 teeth	2	10/6	5/9		2	-	2
* 4000	Hub (short)	2	8/0	4/6		-	-	-
* 4001	Hub (extended)	2	13/6	7/3		-	-	-
0801	Socket wrench	1	10/0	-		1	1	1
0802	Nut key (double ended) 6mm	1	2/0	-		2	2	2
* 0803	Nut key (single ended) 8 mm	1	2/3	-		2	2	2
* 0804	Allen key	3	1/6	-		3	-	3
0806	Screw driver	1	1/6	-		1	1	1

* NEW OR IMPROVED PARTS

Standard Kit = £ 98. 0. 0. complete

Structural Kit = £ 66. 0. 0. complete

Gear Kit = £ 114. 0. 0. complete

Ordering Instructions

It is important to quote both the PART No. and DESCRIPTION, and to state whether the quantities Required are of PACKETS or Individual PARTS.

Conditions of Sale

- (a) Quoted prices are subject to alteration without notice.
- (b) Quoted prices are net ex Huddersfield including packing.
- (c) All parts and kits normally from stock.
- (d) Payments within 14 days of receipt of goods.
- (e) All prices quoted in previous publications no longer apply.

Jan. 1965