

34. POWER HACK SAW

made with Set No. 3 or Set No. 2 plus Extra-Pak No. 11 and 12



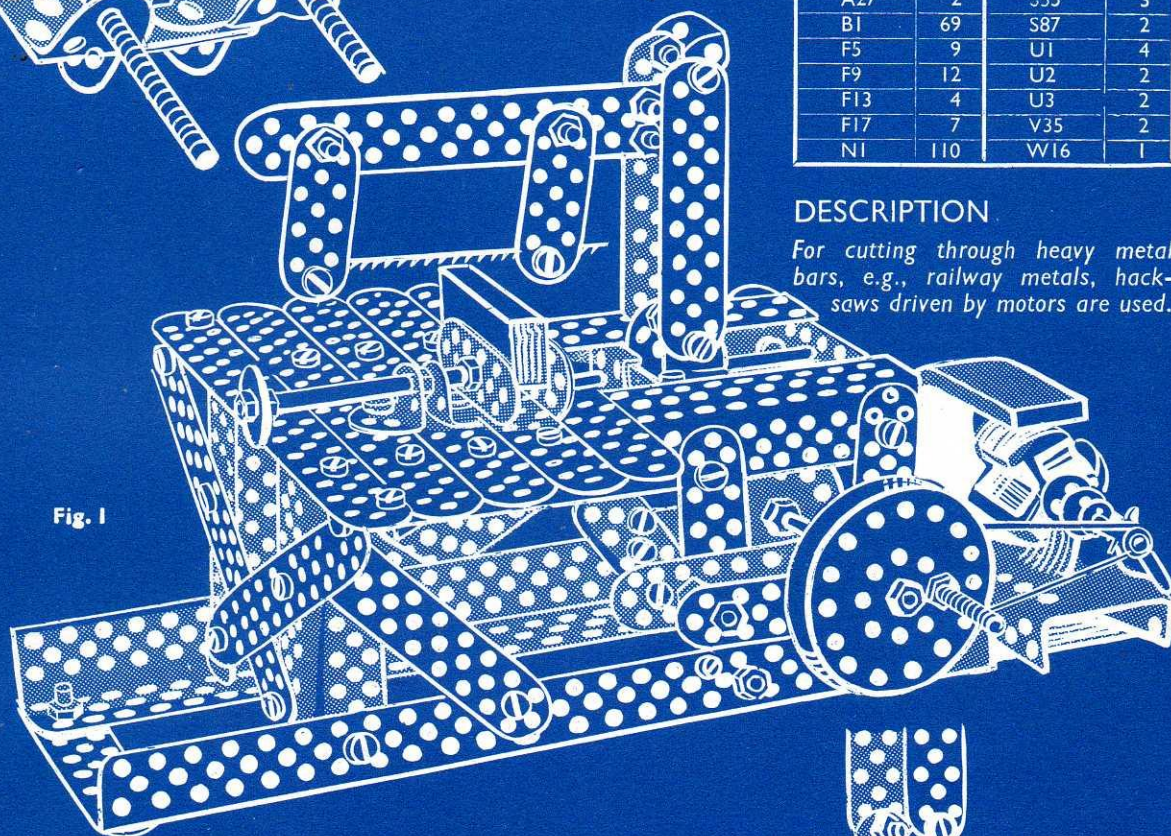
Fig. 3—Enlarged underneath view of Sliding Mechanism

SPECIFICATION			
Part No.		Part No.	
A1	7	P29	1
A9	2	P49	2
A18	2	S25	3
A27	2	S55	3
B1	69	S87	2
F5	9	U1	4
F9	12	U2	2
F13	4	U3	2
F17	7	V35	2
N1	110	W16	1

DESCRIPTION

For cutting through heavy metal bars, e.g., railway metals, hacksaws driven by motors are used.

Fig. 1



CONSTRUCTION

The illustrations show very clearly the construction of this model and should, therefore, be studied carefully before building.

Begin by making the framework (less operating mechanism), table and saw frame. Now make operating mechanism, as shown in Figs. 2 and 3 using SCD 48 for flywheel and pulley. Fit to frame, making sure that the U1's of the mechanism slide freely along the S87's.

Add saw frame and then the table. Finally, fit vice to table. Use piece of fretsaw blade or card for saw blade.

Fit motor 2051 for belt drive.

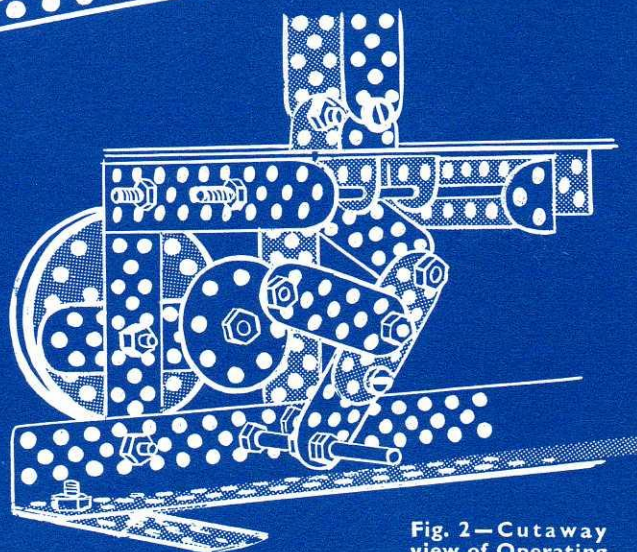


Fig. 2—Cutaway view of Operating Mechanism

35. STAMPING MILL

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 11 and 13

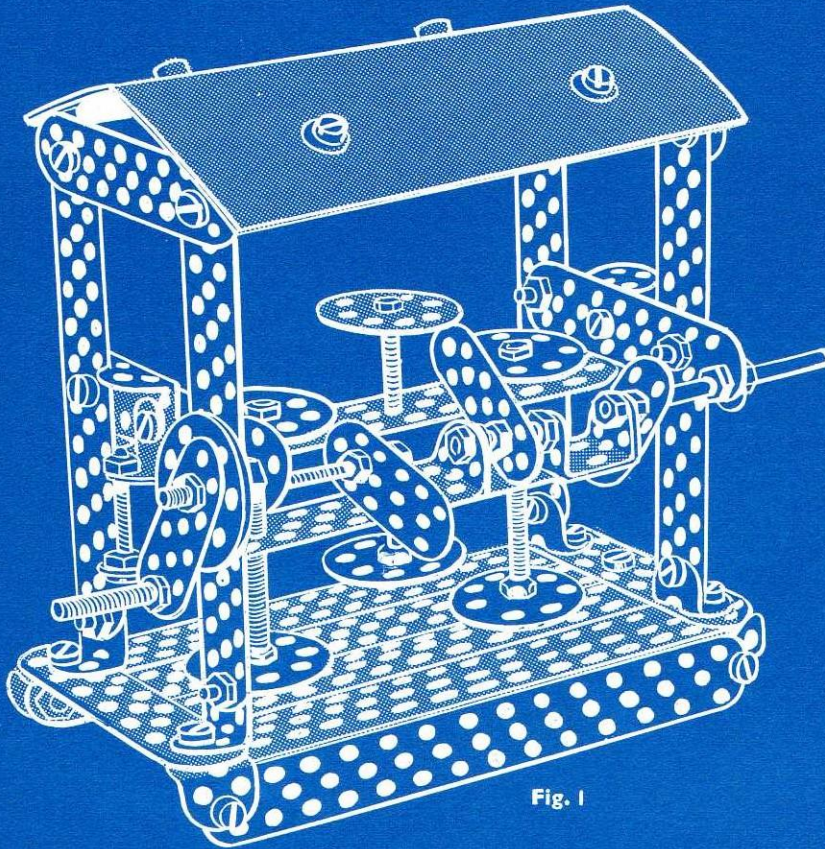


Fig. 1

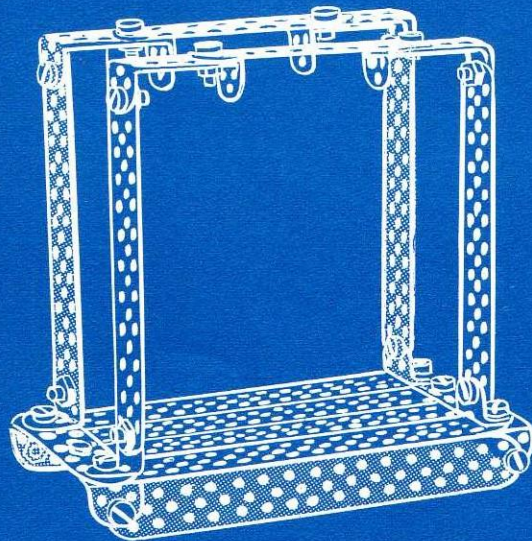


Fig. 2—Frame

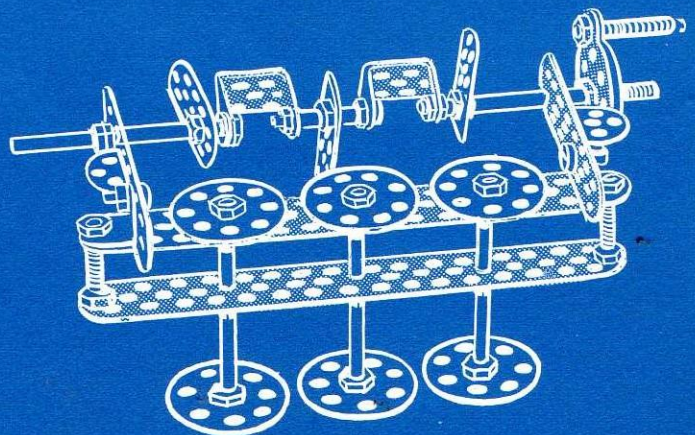


Fig. 3—Stamping Mechanism

SPECIFICATION					
Part No.		Part No.		Part No.	
A1	8	F17	8	U1	4
B1	30	N1	72	U2	4
F5	4	P29	8	W16	2
F9	6	S25	4		
F13	4	S55	5		

DESCRIPTION

Used for crushing ore and rubble into powder form. The ore usually passes under several stampers each one breaking it down to a smaller size.

CONSTRUCTION

For the base, use F17's and A1's strengthened at each end by F9's, carrying further A1's to which are bolted F13's, to form the upright frame. U2's and F9's complete the upper part of roof. This construction is clearly shown in Fig. 2. The stamping mechanism frame (see Fig. 3) is made from two horizontal F17's spaced by S25's and attached by U1's to sides. Stampers are P29's fixed to S55's. Use SCD12 for camshaft and SCD10 attached to crank SCD14.

36. TOWER LORRY

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 11, 12, 13

SPECIFICATION					
Part No.		Part No.		Part No.	
A1	6	F9	12	S55	7
A9	2	F13	4	U1	4
A18	2	F17	8	U2	1
A27	2	N1	90	W10	2
B1	43	P29	5	W16	4
F5	12	S25	4		

DESCRIPTION

If you have tramways with overhead wires in your district you will often see men using a tower lorry like this when repairs have to be done to wires and insulators.

CONSTRUCTION

Uprights of main frame are made from A27's and A18's and A9's (SCD51).

Sides are joined by F9's and F17's. Back is joined by F5's at top and bottom. Front is joined by A1's and an S25, carrying a loose pulley made from two W16's and one W10, kept in place by lock-nuts. At lower end of A18's, front is joined together by an F5 and a U2, carrying a S55 and SCD15 (with B1 as handle). Rear axles are an S25 and an S55 with P29 wheels (SCD9). Front of base is joined by an F5 and two U1's. Front axles are similar to rear.

Each side of upper section is made from three F17's, three F9's and three F5's, as shown. Join sides together by three S55's at platform base and one S55 at bottom end of upper section. A1's are added to act as guides at lower end of this section. (See Fig. 2.)

Now insert upper section into main frame, which entails

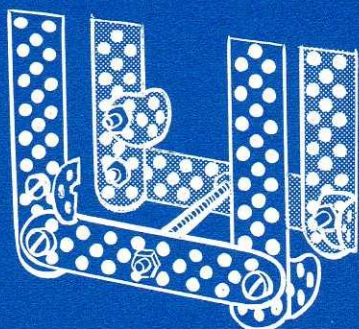


Fig. 2
Cutaway view
showing lower
end of upper
section

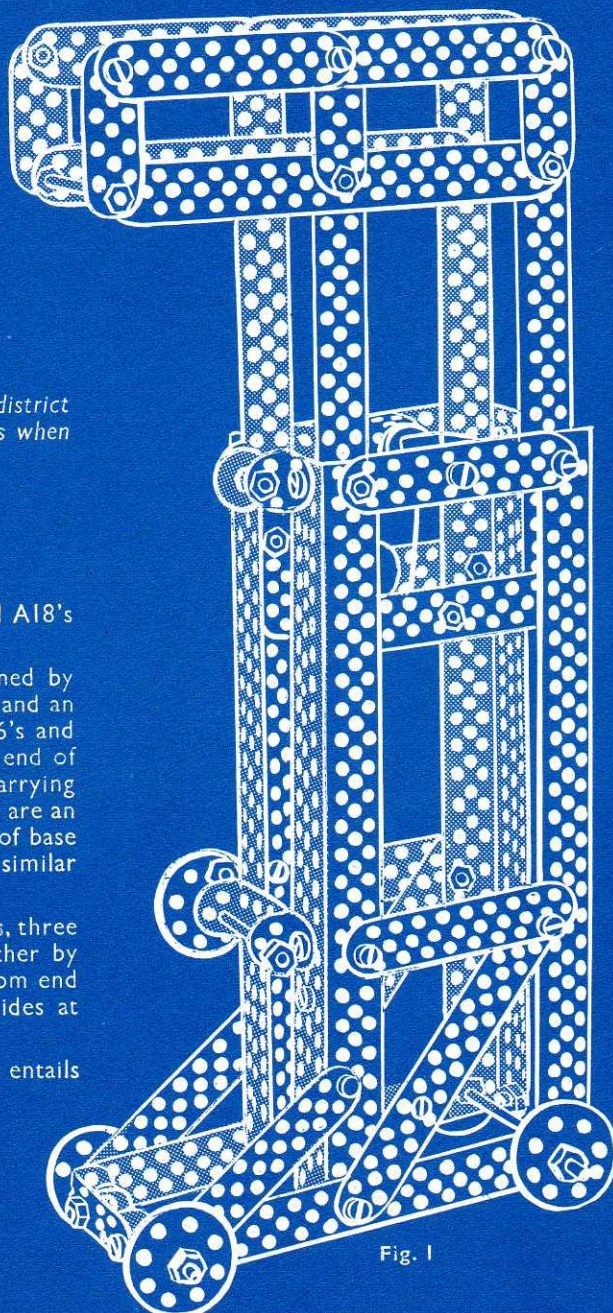


Fig. 1

removing top side F9's. Replace F9's and add two U1's, carrying an SCD11.

Cable is attached from lower S55 of upper section.

37. ELECTRIC FAN

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 11, 12, 13



Fig. 1

CONSTRUCTION

Front and rear of frame are similarly constructed using F17's as base and uprights and top by F9 with A1's at each corner. Join together by U3's at foot and F9's attached to A1's already in place at top. Add bracing of an F9, F17 and A1's to each side. F13's from top corner A1, to centre side bracing A1, are used to carry driving spindle (rear F13 will

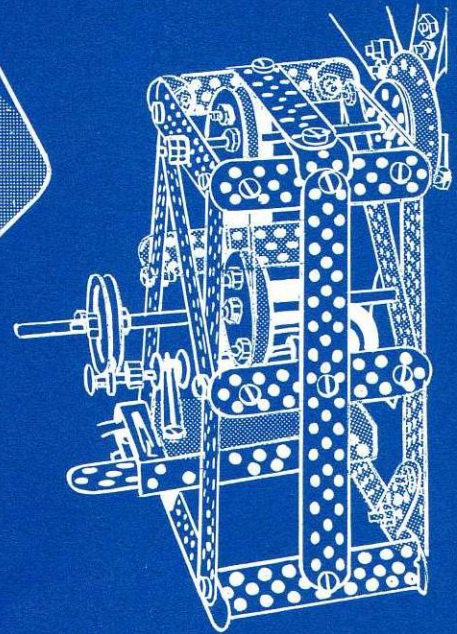


Fig. 2—Cutaway side view

SPECIFICATION

Part No.		Part No.		Part No.	
A1	8	F17	8	S87	1
B1	56	N1	77	U1	2
ER1	1	P29	7	U3	2
F5	6	P49	1	V35	4
F9	7	S25	1	W10	2
F13	3	S55	2	W16	2

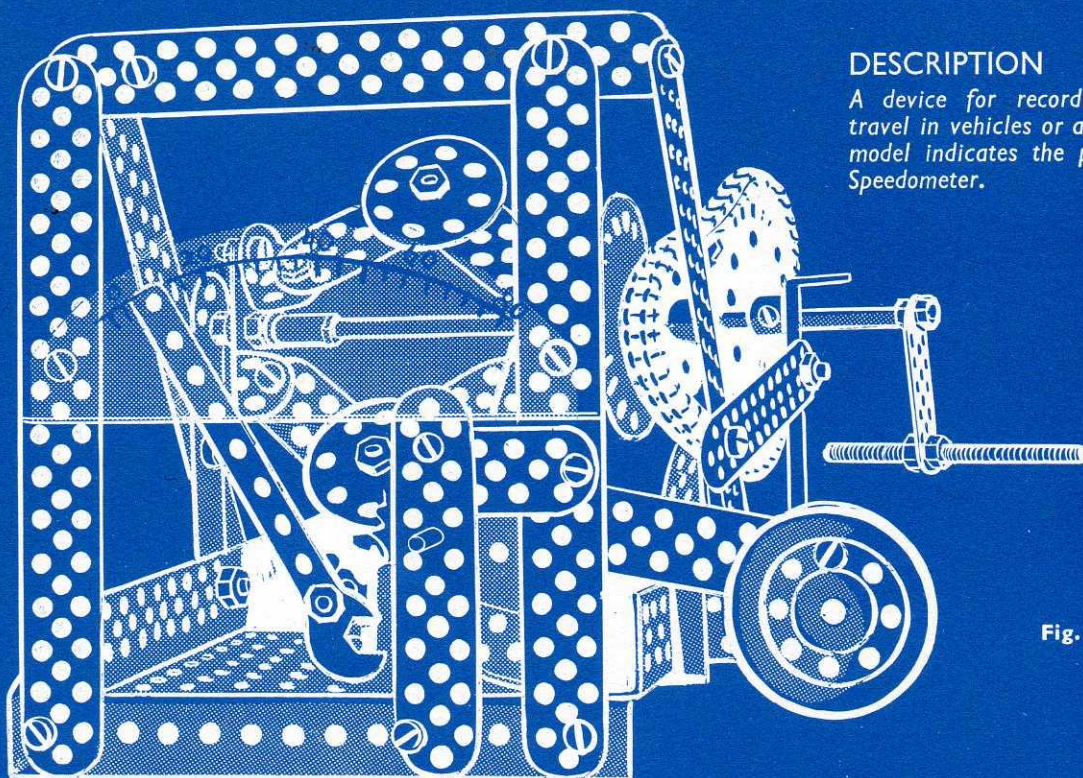
DESCRIPTION

Besides the small fans we use in the home, engineers use fans for ventilating mine shafts, factories and office buildings.

need to be removed when fitting driving spindle). Driving spindle is made from two S55's, joined by lower pulley (SCD47). Fit to frame and add pulley SCD10 and crank SCD15. Fan blades are F5's attached by two N1/B1 to a P49. To give pitch to blades, a nut is placed on one of the bolts between each F5 and the P49. Fan assembly is fixed to an S87 passing through middle hole of top F9 of frame. Four P29's act as spacers between frame and P49. Pulley SCD37 is now fitted to the S87. Use rubber band as driving belt.

38. SPEEDOMETER

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 13, 14 and 15



DESCRIPTION

A device for recording speed of travel in vehicles or aircraft. This model indicates the principle of a Speedometer.

Fig. 1

SPECIFICATION							
Part No.		Part No.		Part No.		Part No.	
A1	4	F13	2	P29	4	U2	2
A9	2	F17	4	P49	2	U3	2
A18	2	G10	1	S25	2	V35	4
B1	50	G20	1	S55	3	W10	1
B2	2	GB20	1	S87	2	W16	2
E1	1	GB40	1	SU1	2	Sp	1
F5	8	N1	74	SU2	2	Ch	1
F9	6	N2	1	U1	2		

When the spindle is rotated by means of a GB40 and GB20 the governor weights fly out so moving the flywheel along the spindle. This movement is transmitted to a dial hand (Sp) via gears as shown in Fig. 2. The V35's on an F9 serve as a weight to return the speedometer to zero when at rest.

CONSTRUCTION

Base is an E1, A18's and A9's. Front frame made as in Fig. 1 and held rigid by sloping F17's to which are attached F9's to form bearings for governor spindle (S87 and S25 joined SCD46).

On the S25 an F5 is fastened which carries two A1's. On the S87 a flywheel is built consisting of two P49's joined by SU2 and must slide freely on the spindle. To the P49 two A1's are fixed. Governor weights (P29's) and arms (F5's) connect these A1's, as shown, SCD17 being used for the loose joints.

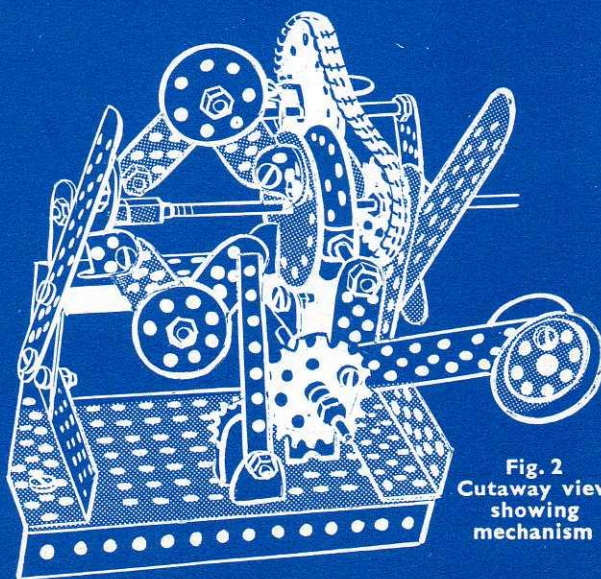


Fig. 2
Cutaway view
showing
mechanism

39. SEWING MACHINE

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 11, 12, 13 and 16

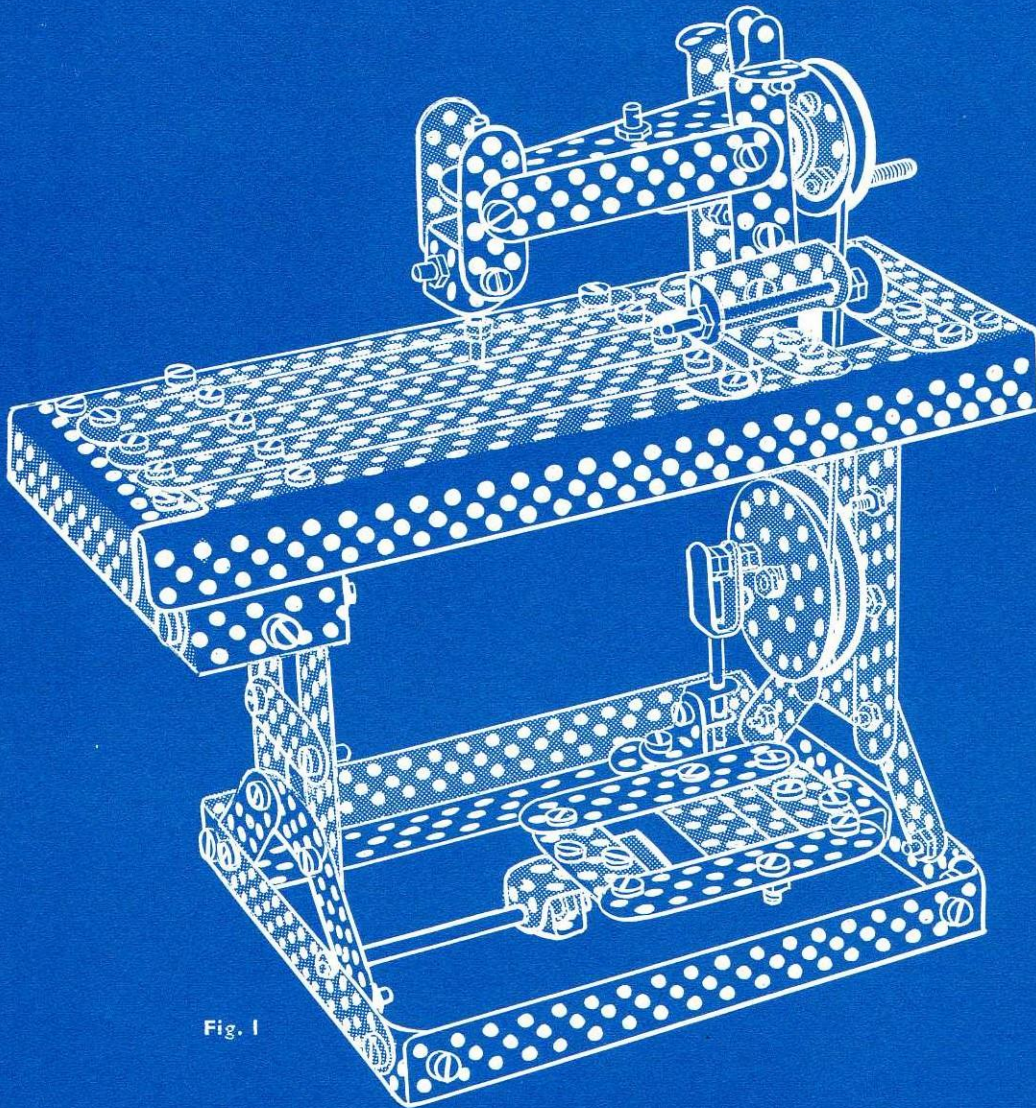


Fig. 1

DESCRIPTION

Ancient peoples had to sew their skin coats together with "needles" made from fish-bones and "thread" of sinews or thin strips of hide.

Nowadays most sewing is done by machine—sometimes by single machines worked by a treadle like the one shown here and sometimes by whole batteries of machines worked from overhead shafting.

Here you have the principle of a rocking or reciprocating motion (of the treadle) converted into a rotary motion by the crank and again into a reciprocating motion in the beam carrying the needle.

SPECIFICATION

Part No.		Part No.		Part No.	
A1	8	F13	6	SU2	2
A9	2	F17	3	U1	4
A18	2	N1	113	U2	6
A27	2	P49	2	U3	2
B1	79	S25	4	V35	4
ER1	1	S55	5	W10	3
F5	13	S87	1	W16	5
F9	12	SU1	2		

CONSTRUCTION

The building of this model should be done in four main stages, fuller details of which will be found below. First make the working table, then the base and table supports. Next make the foot treadle assembly and finally the machine itself together with the spool winder.

The working table (Fig. 1) is made with A27's and A9's as the outer frame, F9's and F17's provide the rest of the table and support for the head.

The vertical supports are F13's and F5's secured to the working table by A1's. The attachment to the base can be seen in Figs. 1 and 2. This base is made of A18's and F13's joined at the corners by A1's.

The treadle footrest is made from F5's and F9's bolted to U2's. These U2's are bearings working on an S87 and S55, joined by SU1 and fixed to each vertical support. The combined pulley and fly-wheel (SCD48) revolves on an S25 attached to the right hand upright. To the P49 is attached another S25 as a crank pin for carrying the crank arm S55 and SU2. The other end being connected to the treadle by an SU1 bolted to an A1 attached to an F9.

The supports for the machine head are two U3's bolted vertically on the table top. The finished head made of two crossed U1's and attached to the U3's by F9's and F5's, acts as the bearing for a vertical S55. This has a W16 on the upper end under which an F9 is placed. On the other end of this F9 an SU2 is bolted which pivots on an S25 fixed in the vertical supports. Between the U3's a U1 with down turned feet is fixed and to this a U2 is fixed (with upturned feet) at right angles. This U2 acts as a bearing for the cam shaft S55, an ERI being the cam. When the pulley (SCD40) built on the shaft, is turned, the horizontal F9 and with the vertical S55 are raised and lowered by means of the cam.

Add cord over grooved wheels to drive the machine.

The spool winder consists of two W16's on an S55 working in a U2 which is fixed to the front U3.

An additional refinement is the drawer for needles and cottons. This is made from two U2's and two F9's with a B1 and two N1's forming the handle. The drawer is fitted to left hand side of the table as shown in Fig. 1.

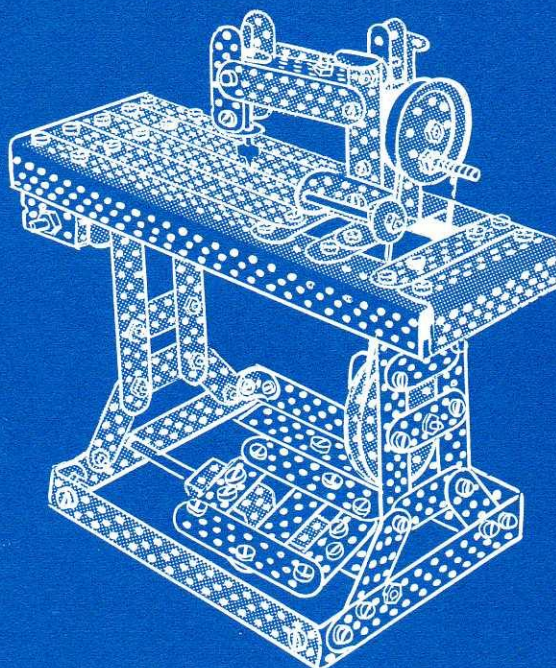


Fig. 2—Left-hand view

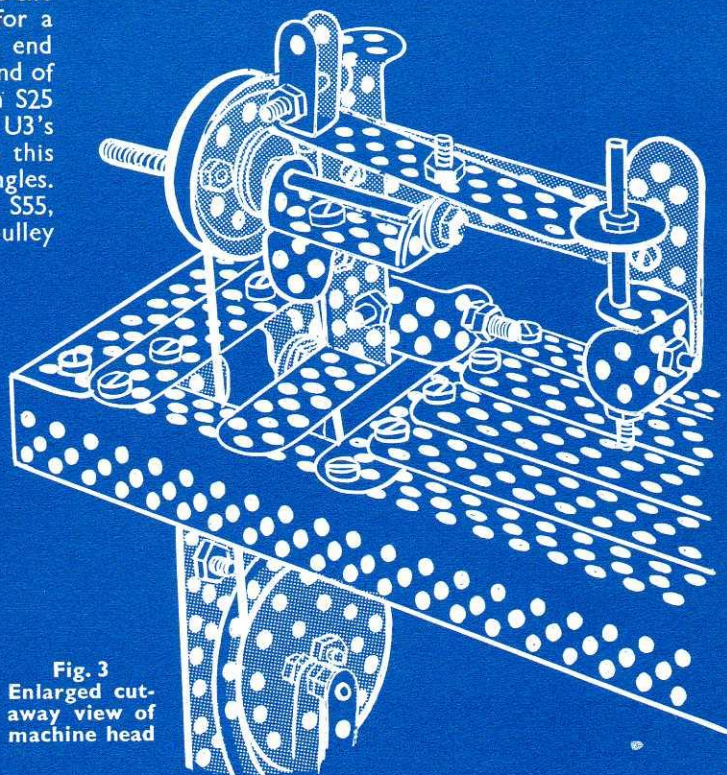


Fig. 3
Enlarged cut-
away view of
machine head

40. TRADESMAN'S TRICYCLE

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 11, 12, 13, 17 and 18

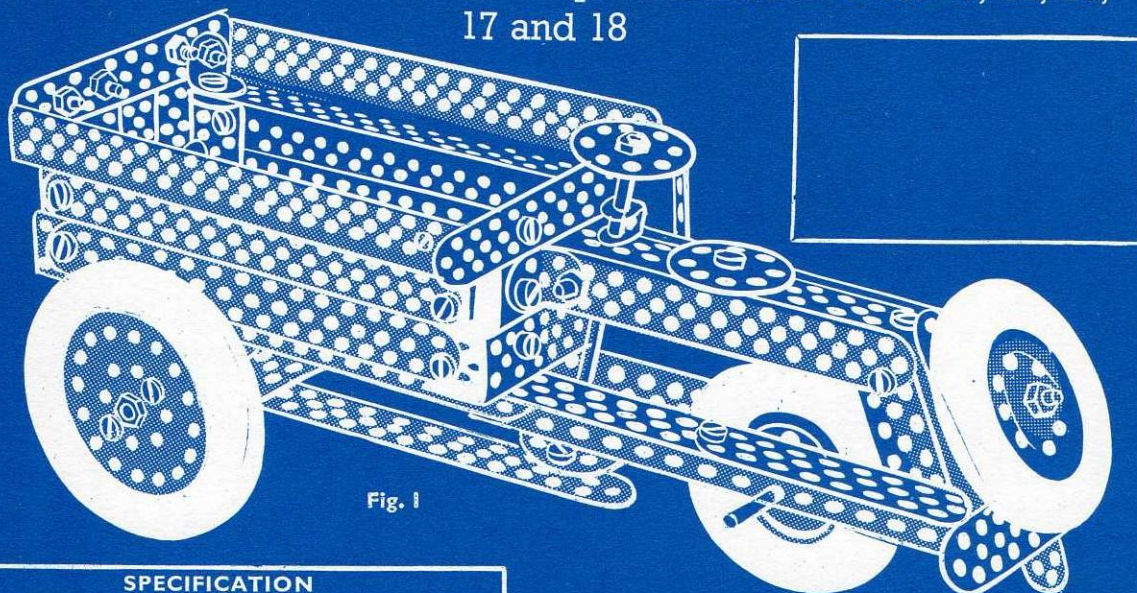


Fig. 1

SPECIFICATION					
Part No.		Part No.		Part No.	
A1	5	F17	6	U1	4
A9	2	N1	91	U2	4
A18	2	P29	5	U3	1
A27	2	P49	4	V35	4
B1	56	S25	1	W10	2
F5	9	S55	4	W16	4
F9	7	S87	1		
F13	4	SU1	1		

DESCRIPTION

The box tricycle was designed to meet the needs of tradesmen where speedy delivery, often in narrow streets, is required.

CONSTRUCTION

Chassis consists of girders (A27's lengthened by F9's) spaced by U1's at front axle, steering column and rear end. These girders are bolted to the A9's, forming base of the carrier box and to the side F5's of rear frame. Carrier box sides are

F17's bolted to U2's, placed vertically on the above A9's. Top sides of box are A18's. Front of the box consists of vertical F5's joined at top by an F5 and F9, and at the bottom to the front cross A9.

The front wheels (SCD49) are attached by S55's to a U3, pivoted on front U1 and spaced by a P29. Rear wheel (SCD39) runs on an S55, passing through chassis girders. Spare wheel (SCD40) is attached to frame by an S25.

The rear upper frame carrying driving seat consists of F13's, bolted to carrier box by A1's and at rear end to a U1 carrying F5's. These F5's are bolted to F9's of chassis extension.

Rear bumper and spare wheel carrier consists of two F9's bolted to rear U1 of chassis.

Steering column is a S87 (located by an SCD24), passing through top of rear frame and a U1 between chassis girders to a P29 at the lower end. Steering is transmitted to the front wheels by an F17, as shown in Fig. 3. Joints are SCD17 and 18.

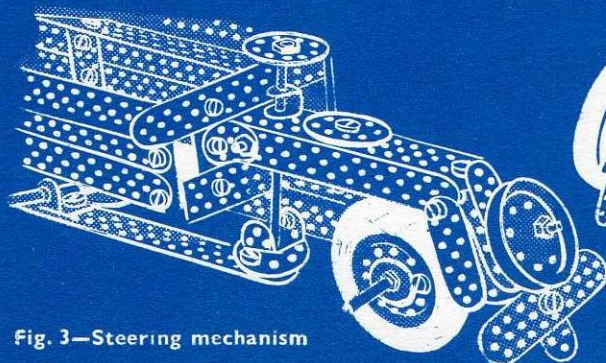


Fig. 3—Steering mechanism

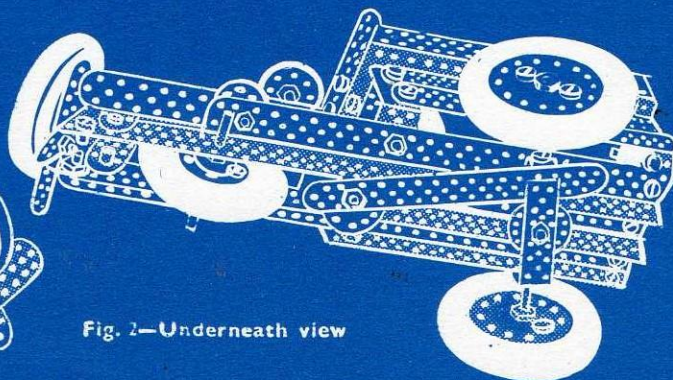
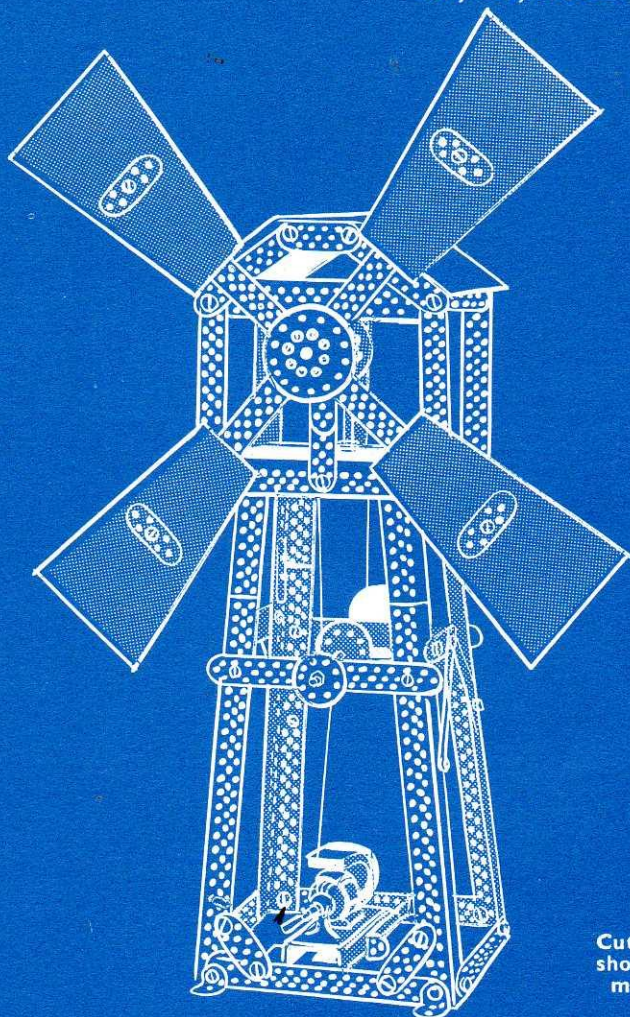


Fig. 2—Underneath view

41. WINDMILL

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 6, 11, 12, 13, 19, 20 and 21



SPECIFICATION					
Part No.		Part No.		Part No.	
A1	8	N1	128	U2	4
A9	4	P29	2	U3	2
A18	4	P49	2	ER1	1
A27	4	S25	1	V35	4
B1	92	S55	6	W10	1
F5	15	S87	2	W16	4
F9	16	SU1	2	Sp	4
F13	4	SU2	2		
F17	8	U1	1		

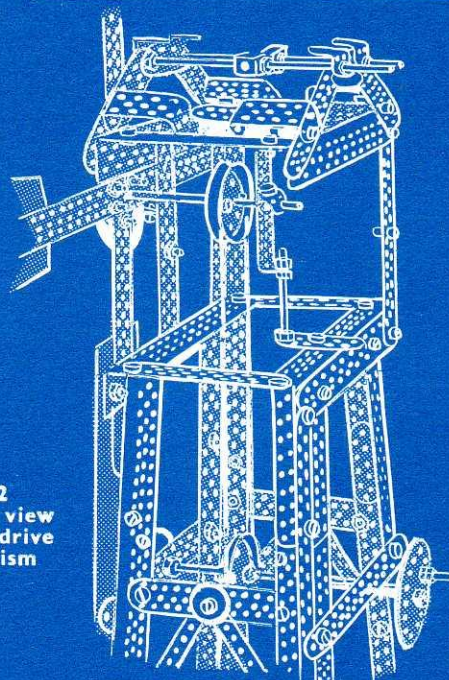


Fig. 2
Cutaway view
showing drive
mechanism

DESCRIPTION

A rare sight in Britain these days, but still to be found in large numbers in Holland. Principal use is for grinding wheat to make flour.

CONSTRUCTION

Commence by building the tower, the uprights of which are each made of an A27 and an A9, using SCD51. Base consists F17's at front and rear and of F13's at sides. F9's and spanners are used to brace the sides. Two A18's are then attached horizontally to the top of the tower as the base for the head, the vertical frame of which is made of F13's and F9's, the latter overlapped to match the former length.

Sail arms are F17's bolted to a P49 and at the other ends are fixed F5's at right angles to carry the sails.

Make sail arm spindle assembly as shown in cutaway photograph, Fig. 2. The front bearing for the sail arm spindle (S87) is made of two F9's bolted to front frame. The rear bearing is a U3, bolted to the top of the head by two F5's and the bottom to an S55, secured by an F5 to the rear of the head frame. On this is set a pulley SCD37.

The driving spindle consists of an S87 and an S55, joined by an SCD47. The driving wheel is a P49 with an S25 as handle. The roof of the head is made of four F9's set at an angle and joined by F5's held firmly by S55's, joined by SU2's as shown.

42. FUNICULAR RAILWAY

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 6, 11, 12, 13, 19, 20 and 21

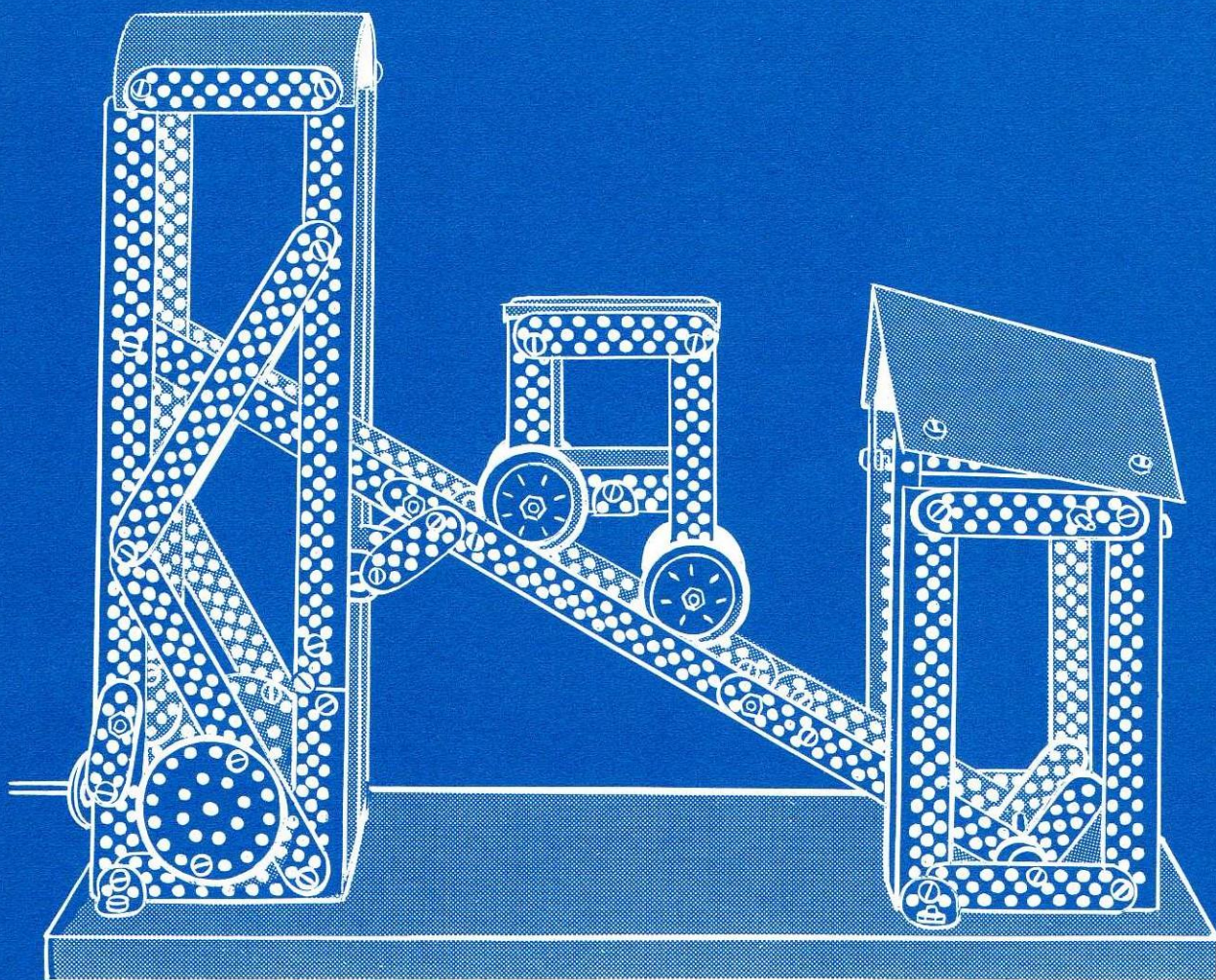


Fig. 1

SPECIFICATION							
Part No.		Part No.		Part No.		Part No.	
A1	8	F9	16	S55	8	V35	4
A9	4	F13	4	S87	2	W10	2
A18	4	F17	8	SU1	2	W16	4
A27	4	N1	128	SU2	2	Sp	4
B1	82	P29	8	U1	4		
C1	1	P49	2	U2	4		
F5	15	S25	3	U3	2		

DESCRIPTION

Used when it is wanted to draw passengers or goods up a steep slope, e.g., a cliff face, by means of a cord or rope. (Latin word "funis"—cord.) Sometimes there are two cars and one travels down while the other goes up.

CONSTRUCTION

Uprights of main tower are made from A27's and A9's, joined by SCD51. Tops and bottoms of all sides are joined by F9's. Add F17's and P49's as bracing to each side. At twelfth centre hole from top of rear uprights are two S55's joined by an SU2. These secure the upper end of the track. The SU2 carries an SCD11.

Winding gear is made from S87, using U1 as bearing at one end and passing through upright at the other. Add crank SCD14. Brake stop is made from C1 and two W16's and S25. Track is made from four F17's and two F13's, butt jointed by F5's. Track is kept parallel by two S55's, which form tie rods placed at butt joints. Rigid fastening to front of main tower is made from F5's and A1's. Side frames of small tower are made from A18's and F9's. These are joined together at bottom by two U1's, S55 and one U2, to which is fixed the lower end of track. Two F5's are used as rail stops. Top is joined by S87, SU1 and S55. Use four Sp's for roof.

Short side and top of railcar are made from F9's. Long sides from F13's and base from U3's. Sides are joined together by U2's at top corners and middle of base. Use SCD41 for wheels (note only two P29's are used per wheel). S55's form the axles. The lower axle carries an SU2, to which is attached the cable.



Fig. 3—Winding Mechanism



Fig. 2—Railcar

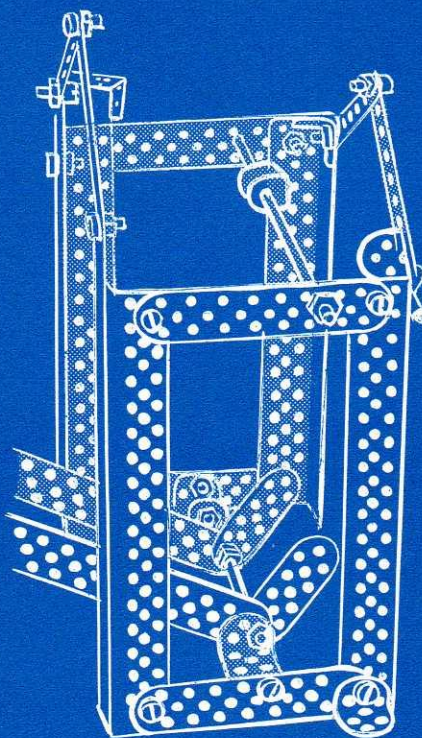


Fig. 4—Small Tower

43. MOBILE DOCKYARD CRANE

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 6, 11, 12, 13, 19, 20 and 21

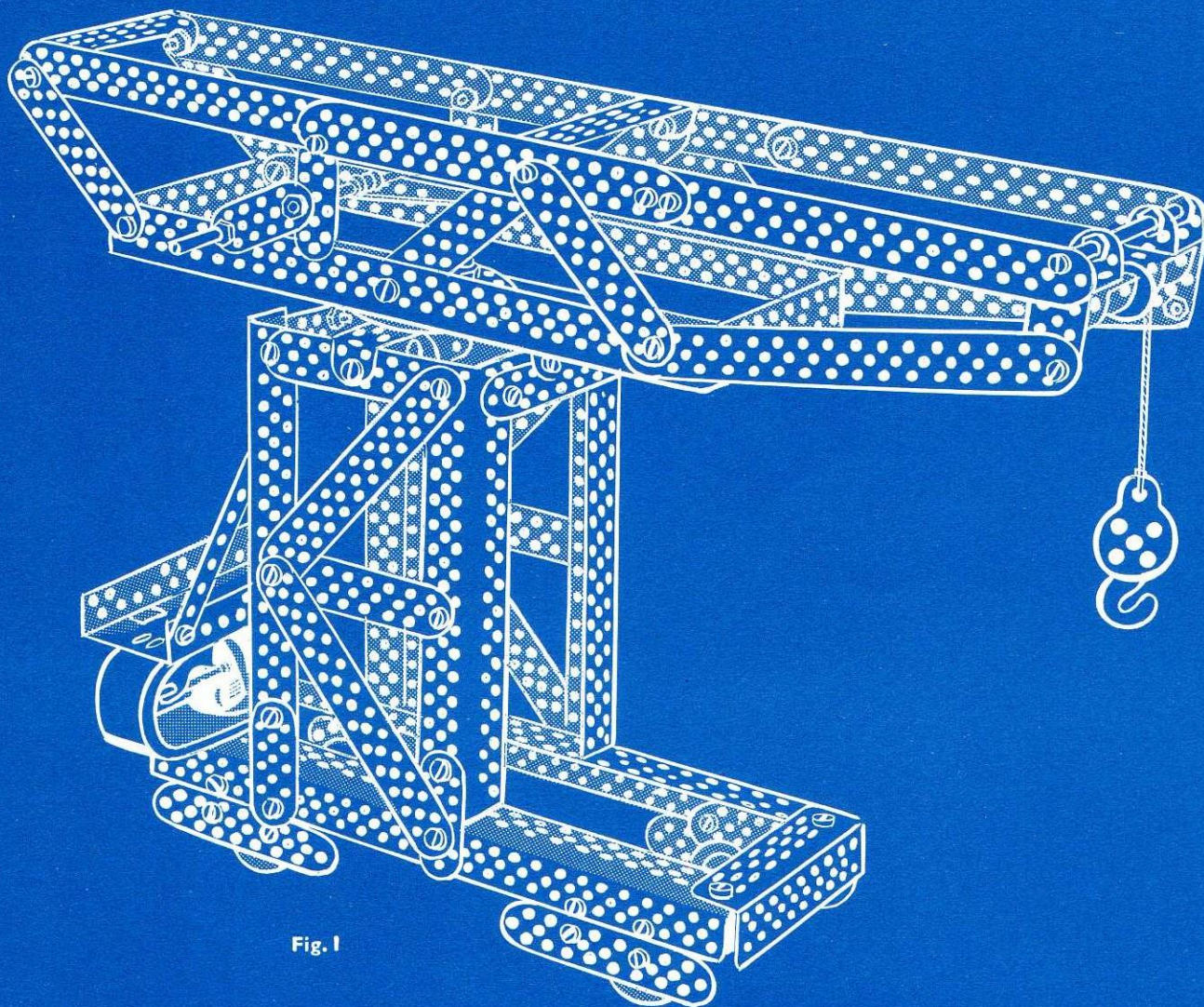


Fig. 1

SPECIFICATION					
Part No.		Part No.		Part No.	
A1	1	F17	8	U1	4
A9	4	N1	128	U2	4
A18	4	P29	7	U3	2
A27	4	P49	3	V35	4
B1	82	S25	3	W10	2
C1	1	S55	5	W16	4
F5	15	S87	1	Sp	1
F9	16	SU1	2		
F13	4	SU2	2		

DESCRIPTION

Mobile Dockyard Crane running on rails and used for unloading light cargoes in limited space.

CONSTRUCTION

The base platform is made of A27's and A9's bolted on the upper side. To the outside edges are bolted F5's, which carry F9's acting as bearings for the flanged wheels (SCD41, but with only one P29 each). Axles are S25's and S55's, joined by an SCD27. In addition, the rear axle carries an

SCD10 to take the belt drive from the motor 2051. The uprights of the tower are A18's, joined at the top and centre by F9's and crossbraced by F13's and fixed to the base by F5's.

The lower bearing plate (P49) for the jib is attached to the tower by four U2's. Attached to one of the U2's, an A1 acts as a lower bearing for the spindle. The base of the jib is made of A27's and A9's, extended at the front by sloping F17's and the rear by F9's. The F17's are attached to the upper part of the jib frame by F5's, whilst the rear F9's meet the upper frame, each side of which is made by three F17's overlapped two holes.

The whole upper frame is spaced by U3's at rear and centre. The front end is made of U1's and S55 supporting two more U1's and an S55 which carries SCD11, over which passes the hook rope. Two F5's are bearings for S87 and crank (SCD14) as winder, but are attached only to upper part of frame.

The bearing for the jib is a P49 attached to the A27's by two F5's, as shown in Fig. 5. The two extra nuts and bolts shown here act as spacers which keep the jib steady when rotating.

The spindle (S55) is first fixed to the above P49 by two N1's, and rotates in the bearing at the top of the tower. A loose P49 forms a bearing plate between the bearings, whilst at the lower end of the spindle a P29 acts as an auxiliary means of turning the jib. The motor 2051 is attached upside down to the rear of the tower and braced by means of a spanner, and so placed that the belt drive coincides with the SCD10 on the rear axle.

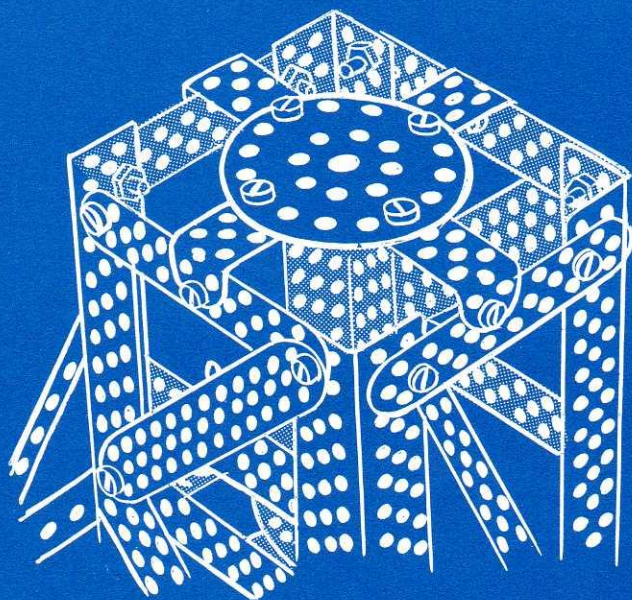


Fig. 2—Showing top of Tower

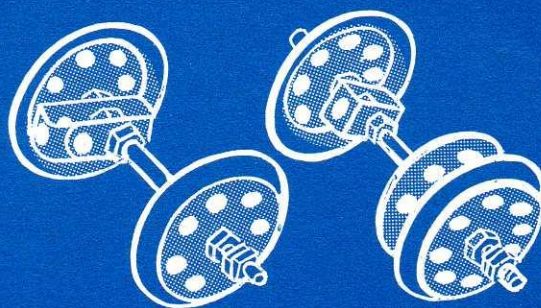


Fig. 3—Wheel Assemblies



Fig. 4—Details of Motor Fixing

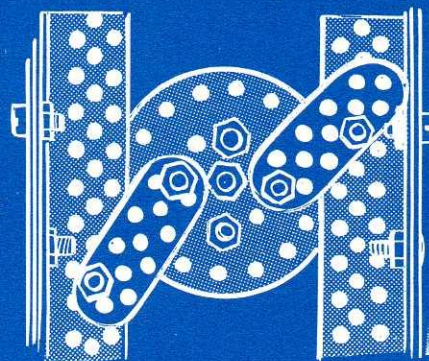


Fig. 5—Jib Bearing Plate

44. BEAM ENGINE

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 6, 11, 12, 13,
2 UNIT 19, 20 and 21 TOR 2051

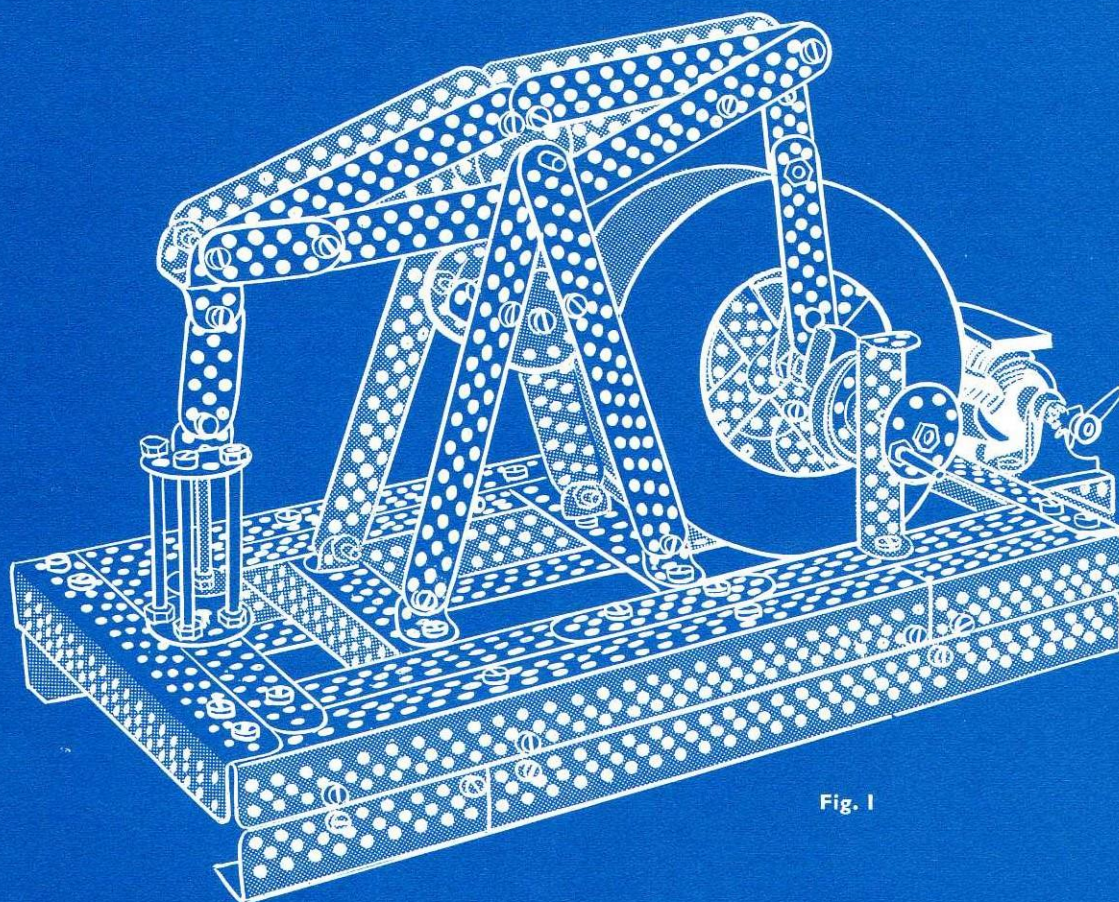


Fig. 1

DESCRIPTION

The Beam Engine represented one of the earliest applications of steam power to industrial needs and was originally used in textile machinery and looms. In earlier models the "beam" consisted of a heavy baulk of timber which rocked about a trunnion in see-saw fashion.

The principle still has its applications, although, of course, the beam is usually of modern girder construction. By suitably positioning the pivot or trunnion so that one arm of the beam is longer than the other (the short arm being weighted so as to balance the beam) a long "throw" at the far end is secured for a comparatively short movement of the steam engine piston that drives the beam—an elementary form of "gearing-up" in fact!

SPECIFICATION

Part No.		Part No.		Part No.	
A1	7	F13	4	SU2	2
A9	4	F17	8	U1	4
A18	4	N1	128	U2	4
A27	4	P29	7	U3	2
B1	82	P49	2	V35	2
F5	9	S25	2	W16	3
F9	16	S55	8		

CONSTRUCTION

The building of this model should be made in three stages commencing with the base, then the beam and supports and finally the flywheel assembly.

The sides of the base are each made from two A27's and two A9's butt jointed with an F5 and F9, which also fix the two angle strips together (see Fig. 1). A18's form the ends and added rigidity is

given to the base by two A18's across the well, one 10 holes in from the piston end and the second 11 holes further along.

An F17 is placed at the end for supporting the cylinder. The beam supports F17's are attached to the A18's already in position by A1's. These supports are held firmly together by P29's 6 holes from the top and spaced apart by two U1's. In the top centre holes of the F17's an S55 is placed which is the beam pivot.

The beam is made of F13's, F9's and F5's, joined at the ends by U1's and in the centre to P29's, locknotted on the S55 mentioned above.

Now make the cylinder which is SCD50, noting that two of the S55's have no NI's holding them to the top P29. The cylinder is secured to the F17 in the base by a B1/NI through the centre hole in the lower P29. The piston rod (S55) is linked to the beam by two A1's and an F5 as connecting rod. A loose joint SCD17 is used to join both A1's to the F5.

The flywheel is made of F9's, U2's and P49's secured to a shaft S55. Attached to the end of this shaft is a crank made from two SU2's and an S25 with another S55 for the pulley spindle. This is similar

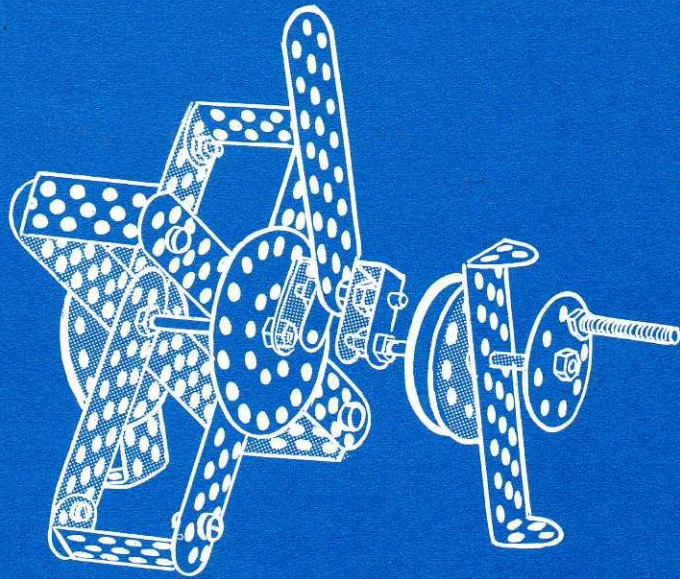


Fig. 2—Crankshaft Assembly

to SCD30, except that the ends of the shafts (S55's) are fixed to the SU2's by NI's. The crankshaft works in U3 bearings and is rotated by a pulley SCD40 or crank handle SCD15.

The U3 which supports the pulley end of the crankshaft is bolted to an F17 which, together with another F17 and F9 runs along the top of the base. The U3 on the other end of the crankshaft is bolted direct to the A9 which forms the top of the base on that side.

The S25 of the crank carries a connecting rod (F9 and F5), secured to the beam by an A1 using SCD17 for the loose joint.

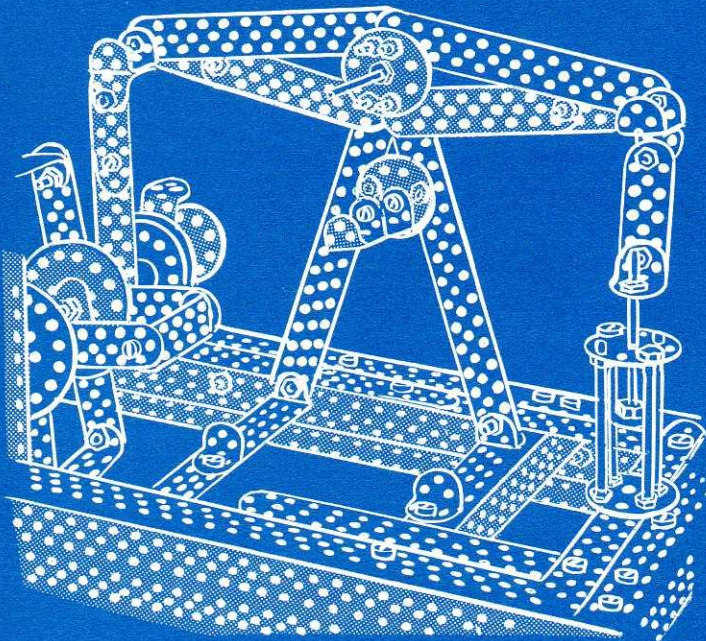


Fig. 3

View showing constructional details with one side of beam and support removed

45. TWIN-ENGINED MONOPLANE

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 6, 11, 12, 13, 19, 20 and 21

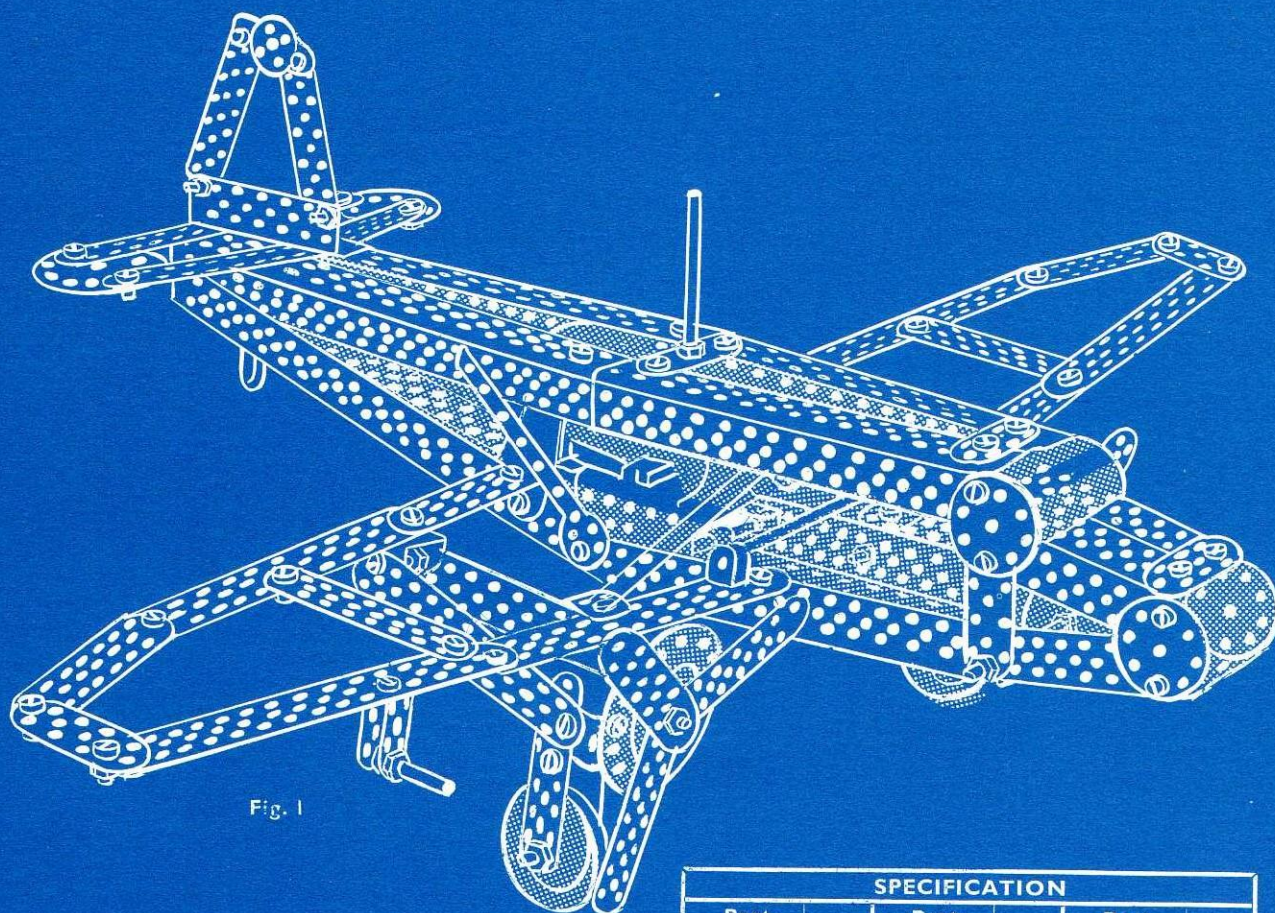


Fig. 1

DESCRIPTION

A composite version of a general purpose low-wing, twin-engined monoplane.

CONSTRUCTION

The main fuselage is made from four A27's and four A18's laid out to form an accepted fuselage design, F5's are used top and bottom as braces. The nose of the plane consists of two A9's on top and two U3's below—these, as well as the P29's, can be used to support perspex or celluloid as windows. Before securing the upper A18's to the A27's, the motor should be inserted and bolted in place, securing it finally at a later stage by S55's. Before securing the motor, care should be taken to line the belt drive with the SCD11's in the nacelles. Spanners are used as braces on the sides of the fuselage. The aerial mast is an S55.

SPECIFICATION

Part No.		Part No.		Part No.	
A1	8	F13	4	SU2	2
A9	3	F17	7	U1	4
A18	4	N1	124	U2	4
A27	4	P29	8	U3	2
B1	92	P49	4	V35	4
C1	2	S25	3	W10	2
ERI	1	S55	6	W16	4
F5	16	S87	1	Sp	2
F9	16	SU1	2		

The mainplane, attached to the bottom of the fuselage by A1's, is made from F17's, F9's, is constructed with a straight leading edge, and tapered trailing edge with F5's at the outer ends to give a slightly clipped wing effect, and has slight dihedral from the roots. An F9 is used as a centre brace on each wing.

An S87 attached by SU1's through the fuselage strengthens the leading edge of the main plane. The tail plane is made with tapered leading edge,

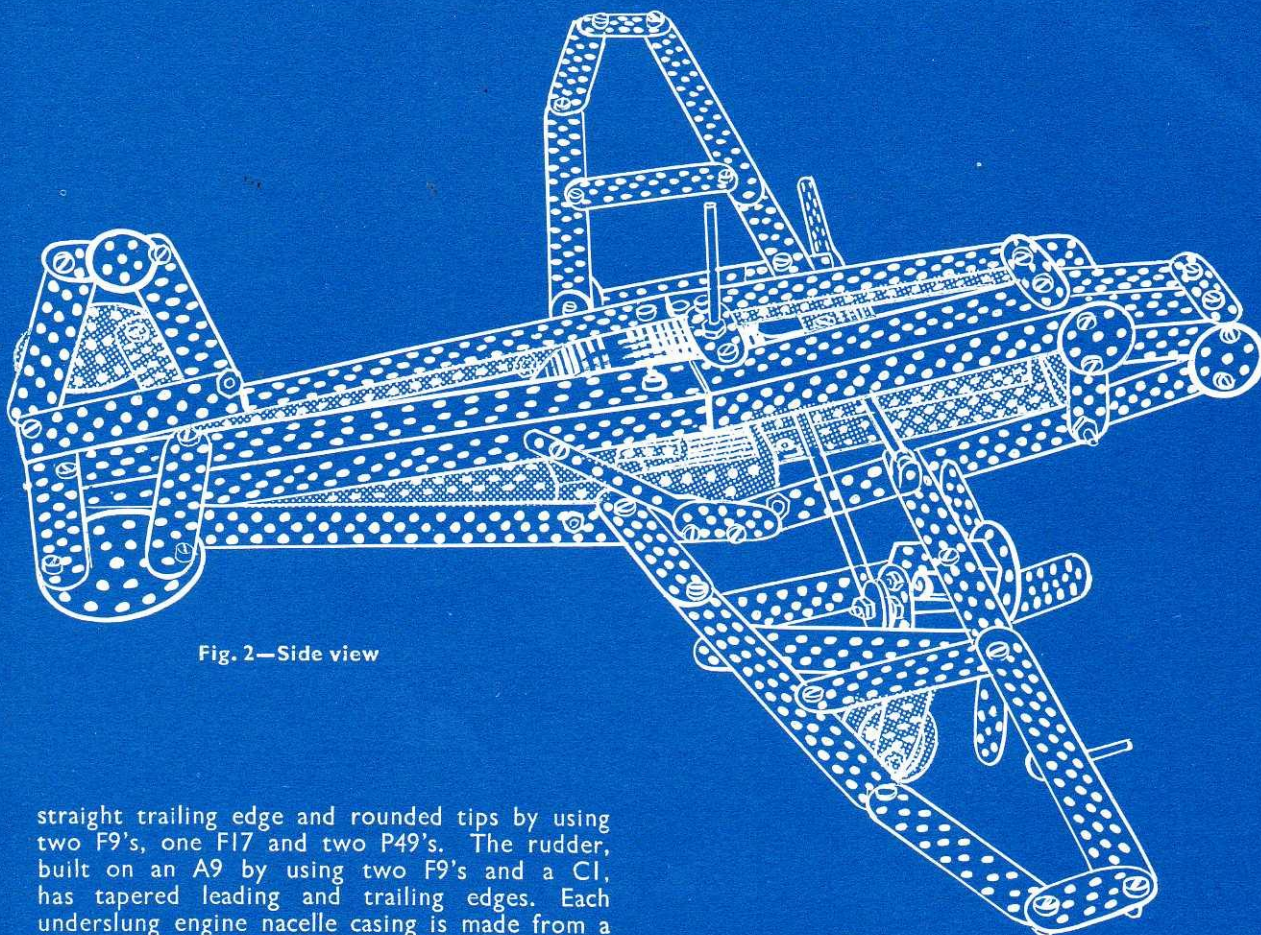


Fig. 2—Side view

straight trailing edge and rounded tips by using two F9's, one F17 and two P49's. The rudder, built on an A9 by using two F9's and a C1, has tapered leading and trailing edges. Each underslung engine nacelle casing is made from a P49 carrying two F13's secured by A1's and tapering to a U1 secured to the trailing edge of the main plane. To the top of the P49 is secured a U2 which in turn is bolted to the leading edge. The object of this U2 now becomes apparent, for when used with a second U2 attached to the P49 and a P29, it forms a bearing, lined up with centre hole of the P49 for the driving shaft (S55), carrying the SCD11

for the belt drive from the motor. To the lower U2 is a U1 carrying two F5's, through the bottom centre hole of which is an SCD40 forming the wheel of the undercarriage. The tail wheel consists of an ERI fixed to axle S25 which revolves in an SU2 attached underneath the fuselage by a C1. The pitot tube fitted on the starboard side is an SU2 and an S25.

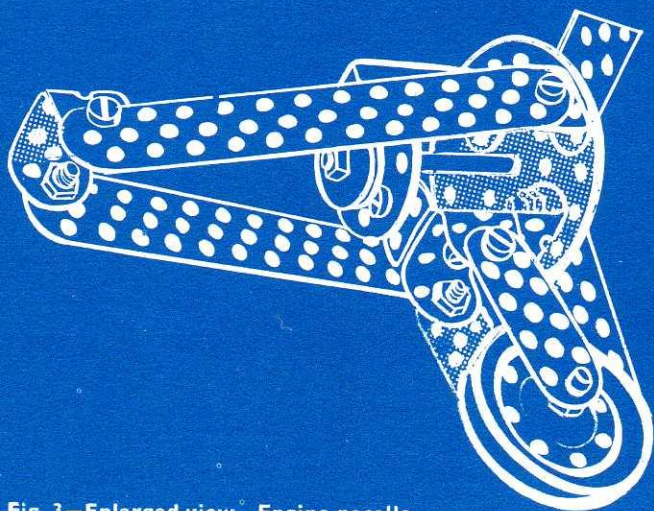


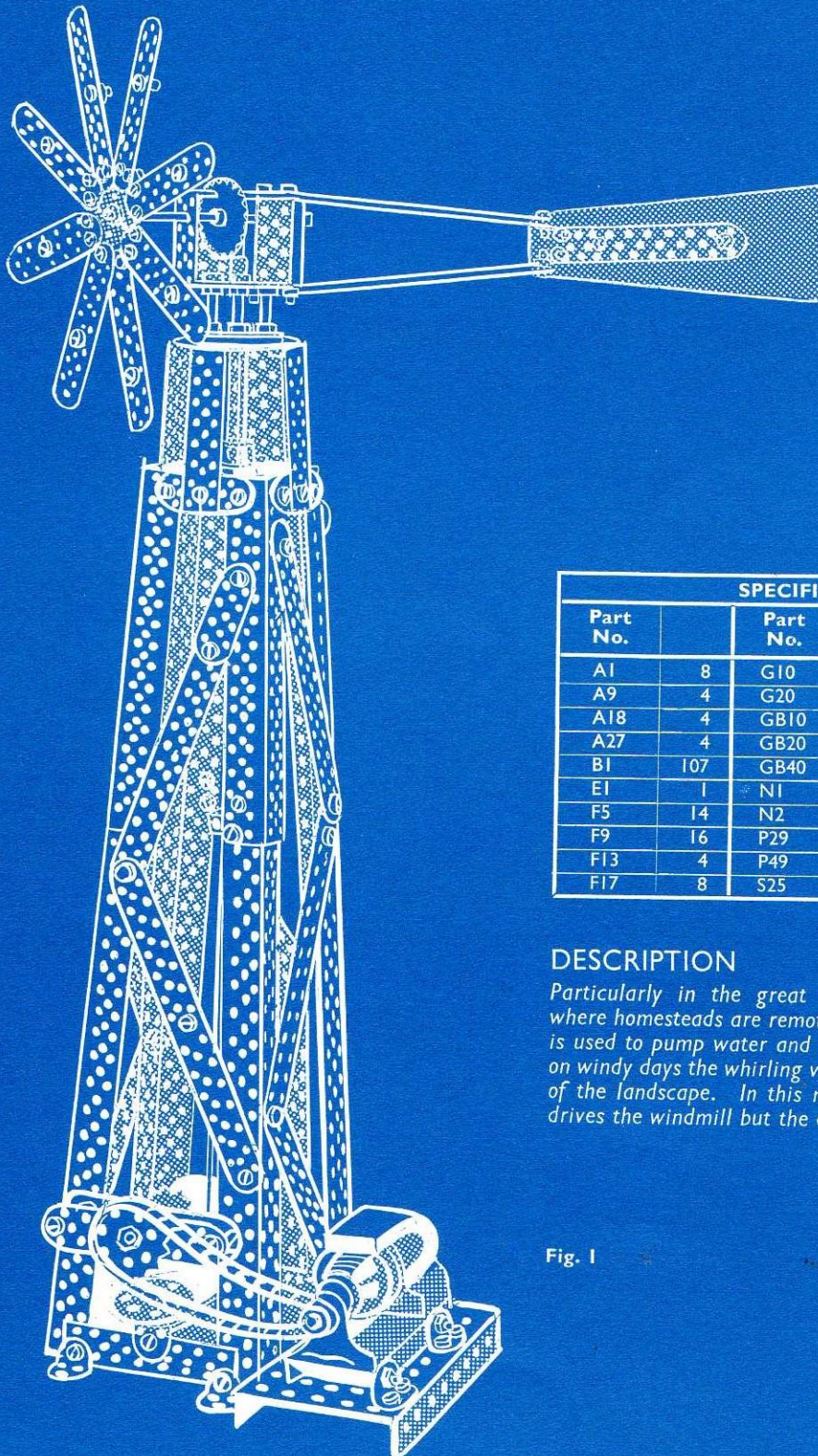
Fig. 3—Enlarged view. Engine nacelle and undercarriage



Fig. 4—Enlarged view showing details of nose construction

47. WIND DRIVEN GENERATOR

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 6, 11, 12, 13, 14, 15, 16, 19, 20 and 21



SPECIFICATION					
Part No.		Part No.		Part No.	
A1	8	G10	1	S55	2
A9	4	G20	1	S87	4
A18	4	GB10	1	SI20	1
A27	4	GB20	1	SU1	3
B1	107	GB40	1	U1	4
E1	1	N1	155	U2	4
F5	14	N2	1	U3	4
F9	16	P29	1	W10	2
F13	4	P49	4	Ch	1
F17	8	S25	4		

DESCRIPTION

Particularly in the great spaces of the Dominions where homesteads are remote from towns, the windmill is used to pump water and to generate electricity and on windy days the whirling vanes are a familiar feature of the landscape. In this model, of course, the motor drives the windmill but the effect is very realistic.

Fig. 1

CONSTRUCTION

The main tower uprights are A27's and A18's joined by F5's as in SCD51, spaced at the base by A9's and tapering to the top where they are spaced by F5's. The sides are braced as in Fig. 1. Attached to the tower base is an E1 to carry the motor 2051. A box bracket made of F9's and U1's is fixed eight holes up from the base of one side. A spindle S55 carrying a G20 and G10 works in this bracket, the G20 being chain-driven by the motor.

Attached to the top of the tower are four U3's as shown in Fig. 2 on both ends of which are P49's. This forms a bearing for the vertical shaft, the bottom bearing of which is an F13 fixed across the base A9's by A1's. The shaft is made up from an S87 and S55 secured by SCD26, two more S87's also secured by SCD26 and finally an S120 secured by SCD46. To the S120 on the lower end of this shaft a GB40 is fixed and meshes with the G10 already in position.

A P29 is attached to a P49 by four S25's and slipped over the top of the vertical shaft which is protruding through, and held in position by a GB10.



Fig. 2—Tower head and upper drive mechanism

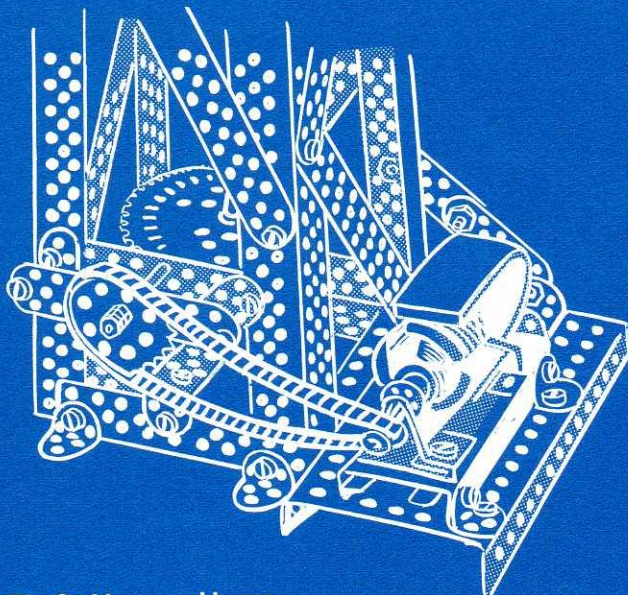


Fig. 3—Motor and lower drive mechanism

Fixed to the top of this P49 are four U2's joined at the top by two F5's as shown in Fig. 2. The sail shaft S87 carrying a GB20 passes through the U2's so that the GB20 meshes with the GB10 already in position. W10's are necessary under the GB10 so that the gears will mesh correctly.

The sail framework consists of eight F9's set radially on a P49. The vane, F13, attached to two F17's by a U1.

In actual practice the current is generated by action of the wind rotating the sails and driving a dynamo, but as sufficient speed cannot be obtained in our model, the motor is used to drive the sails.

46. CONVEYOR

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 6, 11, 12, 13, 17, 18, 19, 20 and 21

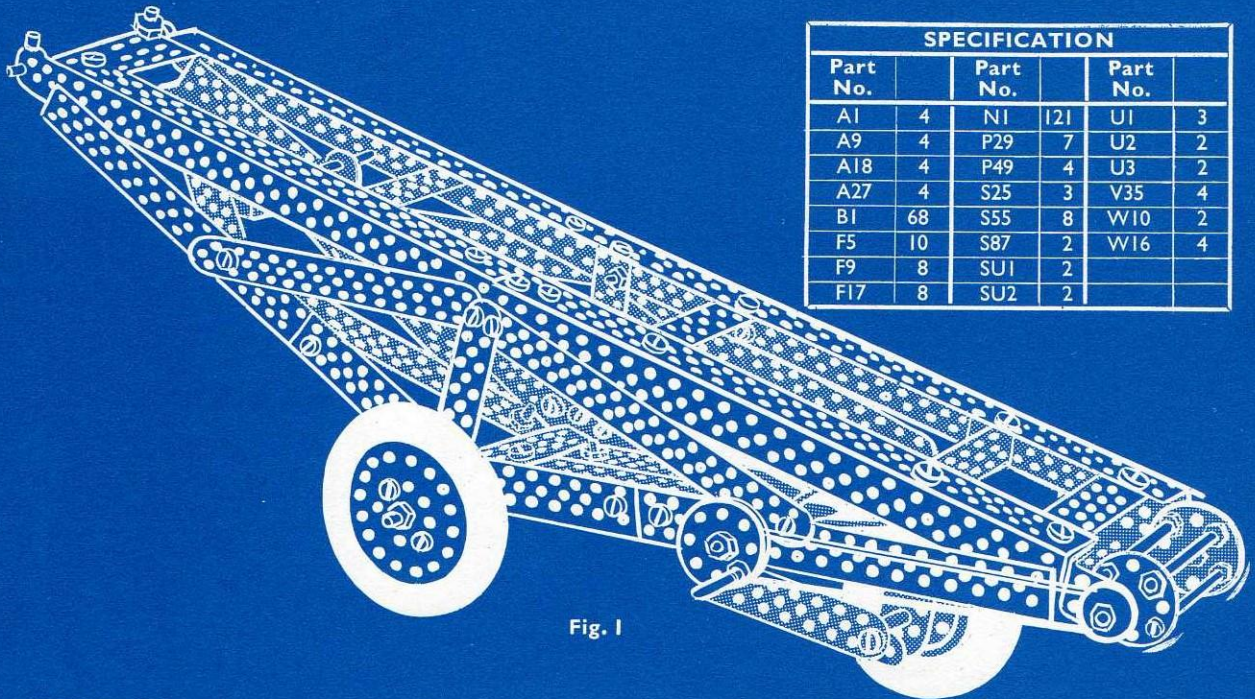


Fig. 1

SPECIFICATION					
Part No.		Part No.		Part No.	
A1	4	N1	121	U1	3
A9	4	P29	7	U2	2
A18	4	P49	4	U3	2
A27	4	S25	3	V35	4
B1	68	S55	8	W10	2
F5	10	S87	2	W16	4
F9	8	SU1	2		
F17	8	SU2	2		

DESCRIPTION

Can be wheeled to the site and there used to convey parcels (by endless belt) from lorry to loft. Farmers use them for building hayricks.

CONSTRUCTION

Each side of upper frame length is made of two A27's, using SCD51. These girders are spaced by four F9's. Lower frame is made of four lengths, A9 and A18, bolted first to the upper frame ends and meeting at P29's, to which are attached the stub axles S55's (joined by a U2). Use remaining F17's as bracing struts on sides and

under frame as in Fig. 2. Rear wheel assembly consists of a bracket made of U3's, carrying two small wheels (SCD39) on an S55 (rear wheel stays are F9's attached to the U3's and frame by A1's).

A roller made of P29's joined by four S55's and attached to the frame by S25's (on one of which is SCD11), carries the conveyor belt at the rear end. At the front end is an S87 to act as a guide. Drum is driven by a band from pulley SCD10 and crank SCD15 on an S87, passing through the frame and into a bearing made from a U1 attached to opposite side. Belt can be made from a length of braid, canvas, etc.

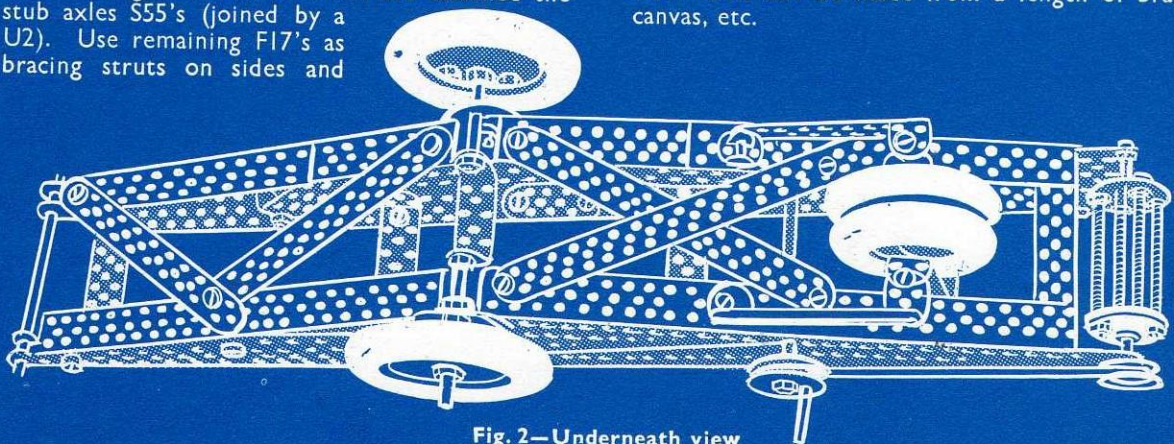


Fig. 2—Underneath view

48. WINDMILL PUMP

made with Set No. 3 or Set No. 2 plus Extra-Pak Nos. 6, 11, 2 Nos. 12, 13, 2 Nos. 19, 20 and 21

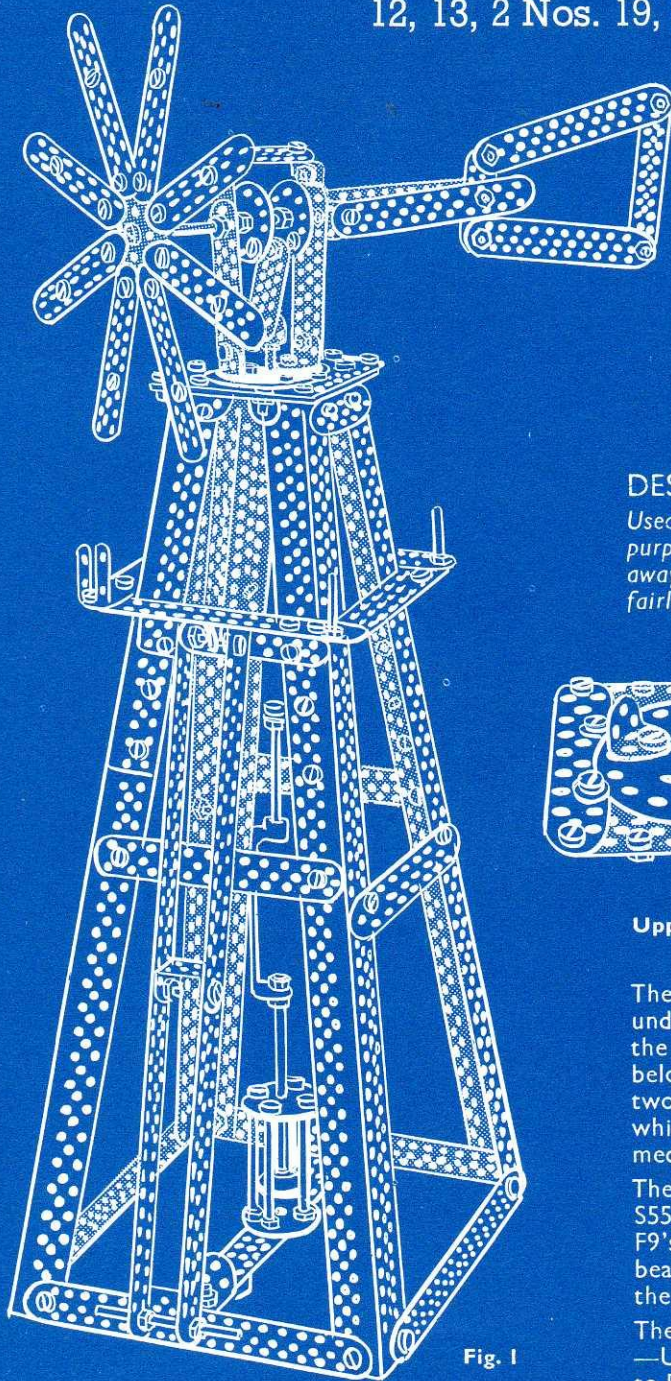


Fig. 1

CONSTRUCTION

The tower uprights are made with A27's and A18's, braced at the foot by F17's and half way up by F13's. The catwalk is made with A9's joined by F5's, secured by two S25's and two SU2's.

The upper platform (Fig. 2) consists of F9's bolted to form a square and attach to uprights by A1's.

SPECIFICATION					
Part No.		Part No.		Part No.	
A1	8	F17	8	SU2	2
A9	4	N1	168	U1	4
A18	4	P29	5	U2	1
A27	4	P49	2	U3	2
B1	108	S25	4	W10	4
F5	14	S55	7	W16	5
F9	20	S87	2		
F13	8	SU1	1		

DESCRIPTION

Used for raising water for agricultural and other purposes. By a special device which turns the sails away from the wind, when the force is too great, a fairly even pumping speed can be maintained.



Fig. 2
Upper Platform

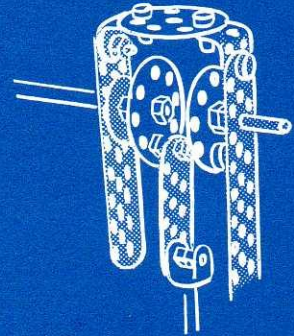


Fig. 3
Pump
Mechanism

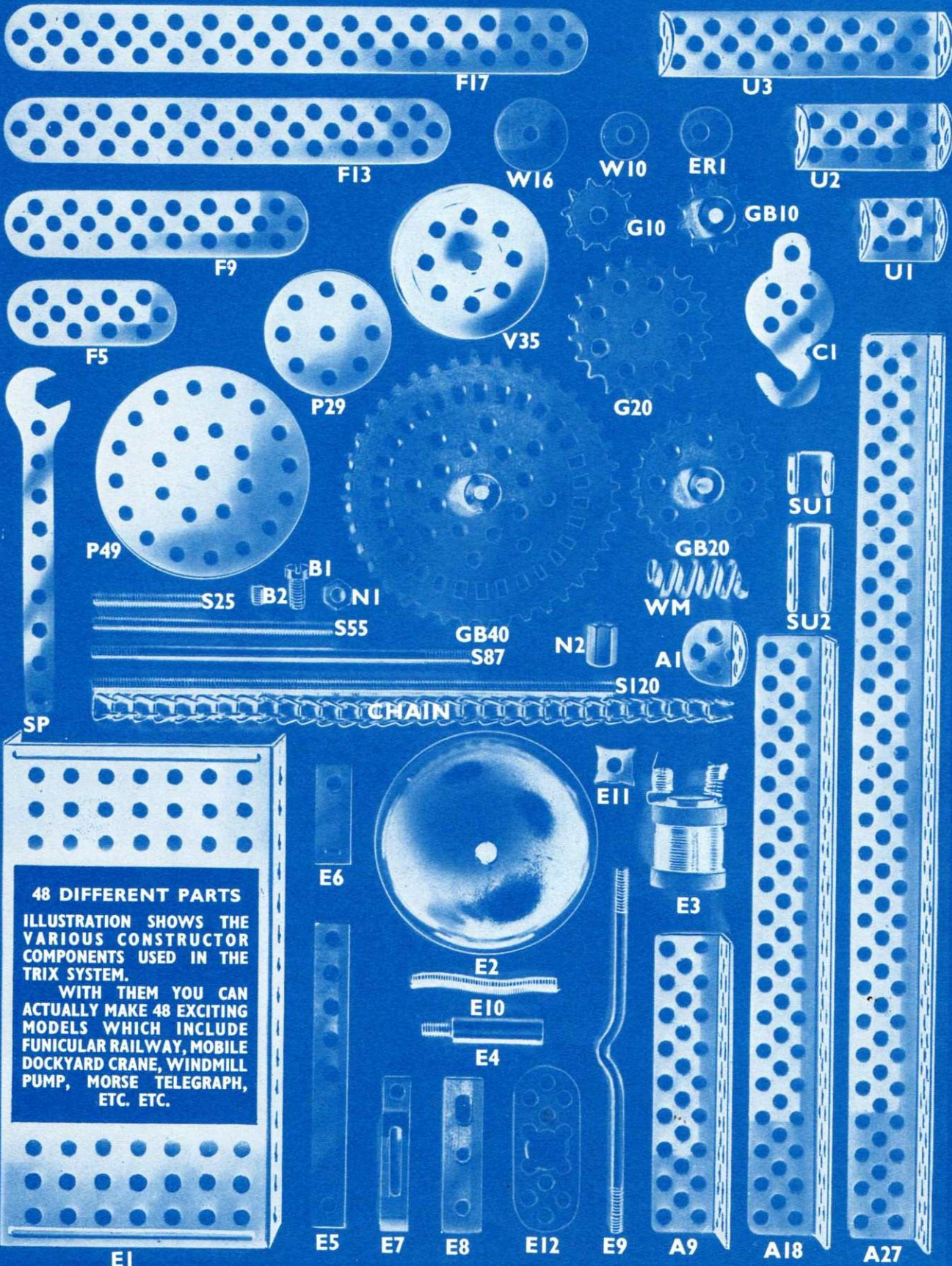
The P49 is free to rotate under W10's secured through the F9's by bolts lock-nutted below. To this P49 are bolted two A1's to carry the F9's which form the upper bearings for the pump mechanism (see Fig. 3).

The crank of the pump mechanism consists of an S55, two P29's and two S25's (see Fig. 3). Vertical F9's joined at top by two A1's and a P29 form the bearings. Connecting rod F5 joins the crank to the pump shaft by an SU1.

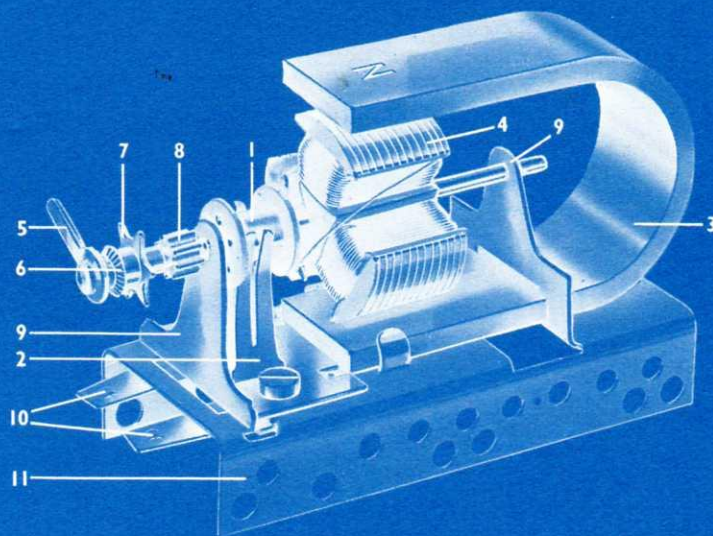
The pump shaft is made up as follows:—An S87—U3—S55—U3—S87—fitted in an (SCD50) bolted to F9's secured to the base by U1's and U2's.

Ladder frame is F17's spaced by U1's. Rungs can be made by lacing string through holes. The sails are bolted to a P49 secured to the S55 in the head mechanism.

The vane supports are F13's secured to the upright F9's by a U2—and the vane frame F5, F9 and F13's.



Permag ELECTRIC MOTOR 2051



KEY

1. Commutator.
2. Contact Brushes.
3. Magnet.
4. Armature.
5. Driver.
6. Pulley Wheel.
7. Chain Sprocket Wheel.
8. Small Gear Wheel.
9. Bearing.
10. Terminals.
11. Base.

HERE is the sturdy and surprisingly powerful Trix "Permag" motor which is used to drive and operate many of the **TRIX** models.

It is mounted on a girder-type base which enables it to be bolted in position within the framework of the model it is working. It can be used with Trix or with other types of Constructional Sets and it is quite literally the "little motor of a thousand and one uses".

The powerful permanent magnet gives a strong "field" and the tripolar laminated armature revolves in sturdy bearings, giving only minimum air gap between the pole-pieces and the magnet. This means that the motor is very economical in current.

For light model work it will run from a single pocket flash lamp battery ($4\frac{1}{2}$ volts), but for heavy work (such as driving cranes or lifting heavy loads) it is better to use batteries with a bigger capacity, e.g., bell batteries or accumulators. Any battery giving between 4 and 8 volts is suitable. The motor should never, of course, be connected up to the house lighting mains, whether A.C. or D.C.

One of the great features of this motor is that it can be used to drive by belt, by chain, by gear or by direct shaft drive. It is very light in proportion to the power it develops and every boy who runs models will want to have one.

Instructions for the construction of a power pack to operate this motor will be found inside the motor carton.

DRIVES

Whichever type of drive you use make sure that the driven gear wheel or pulley is in the same plane as the driver and that the drive is free without being too slack.

BELT DRIVE

A good belt can be made by cutting off a very narrow strip of an old car inner tube. Better still is a piece of thin leather boot lace. Cut to desired length, pierce at each end with a needle and join ends with wire. Avoid clumsy knots.

CHAIN DRIVE

Chain Drive is "positive", but it cannot slip like belt drive. Lengths of suitable chain are supplied in the Auxiliary packets and with the aid of small pliers, any number of links can be detached to give desired length of drive.

GEAR DRIVE

Many Constructor models can be driven by direct gearing. A train of gears (as in clock) can be used to step up or step down the speed.

BOAT DRIVE



The illustration shows how the Permag Motor can be used to drive a motor boat. The drive on the end of motor spindle engages in the fork on the propeller shaft and transmits the rotary motion.

TRIX CONSTRUCTION SETS

Only 48 different parts, yet with them you can assemble 48 different models, ranging from very simple toys to such fascinating engineering models as Mobile Dockyard Crane, or Funicular Railway or even a Windmill.

All the models are fully illustrated, and the method of assembly described in detail, and 4 different sets of assembly prints can be obtained.

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| Set No. 1/13/H | .. | .. | 13 simple models. |
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Leaflet SCD illustrates 50 Standard Construction Details, including Double Disc Wheels; Crank and Pulleys; Piston and Cylinder, Hoist Mechanisms, etc. In addition to illustrating and describing the famous Trix Permag Electric Motor No. 2051.

Any two of the above will be sent post free on receipt of 1s. stamps, or the whole set of 5 will be sent for 2s. 6d.

TRIX, 310, Summer Lane, Birmingham 19.

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