

# 14. HORIZONTAL ENGINE

made with Set No.2 or Set No. 1 plus Extra-Pak No. 1

SPECIFICATION			
Part No.		Part No.	
A1	4	S55	4
B1	32	S87	1
F5	4	SU1	2
F9	4	SU2	2
F13	2	U1	2
F17	4	U2	2
N1	56	U3	2
P29	4	V35	2
P49	2	W16	2
S25	2		

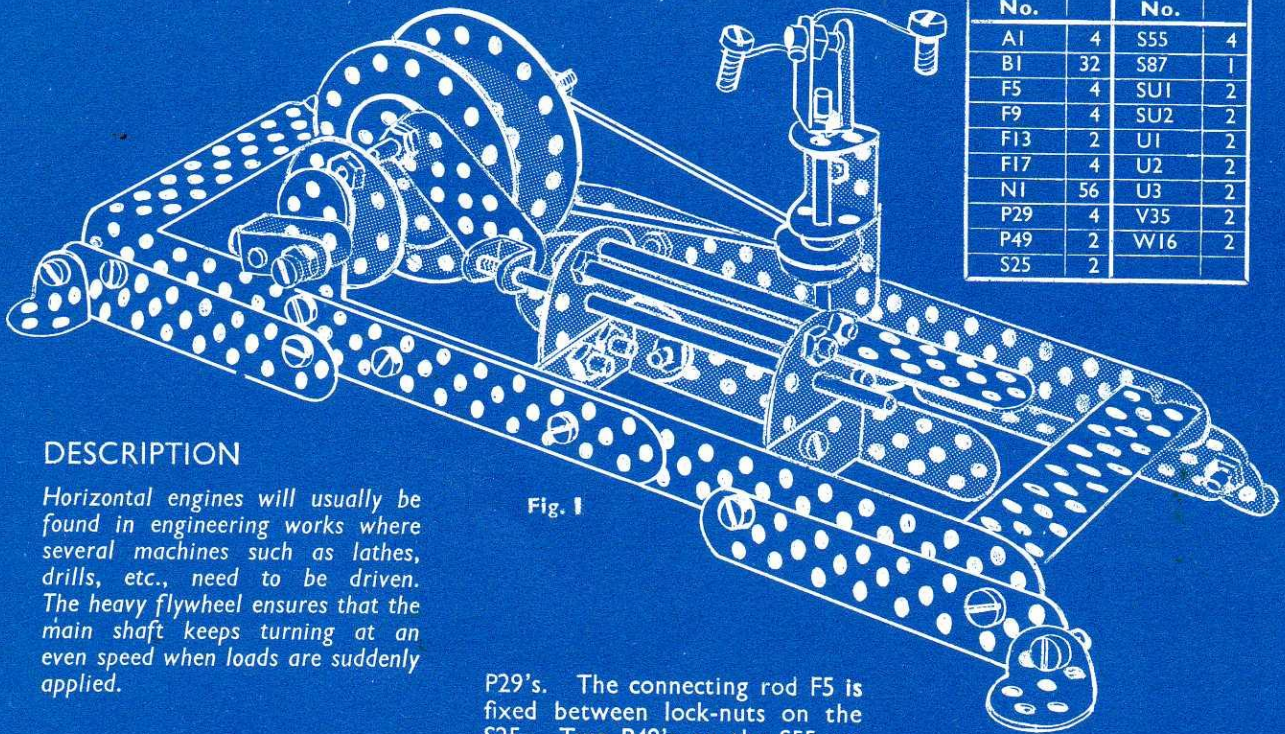


Fig. 1

## DESCRIPTION

Horizontal engines will usually be found in engineering works where several machines such as lathes, drills, etc., need to be driven. The heavy flywheel ensures that the main shaft keeps turning at an even speed when loads are suddenly applied.

## CONSTRUCTION

The frame base is made of F17's, overlapped eight holes and spaced at the ends by U3's. F9's are used as additional supports at the ends of which are fixed A1's as feet. The crank shaft consists of an S55 and two S25's, joined by two

P29's. The connecting rod F5 is fixed between lock-nuts on the S25. Two P49's on the S55 act as flywheel. Two B1's attached by thread to an SU2 represent the governor weights. Construction of the crank shaft and driving wheel are shown in Fig. 2.

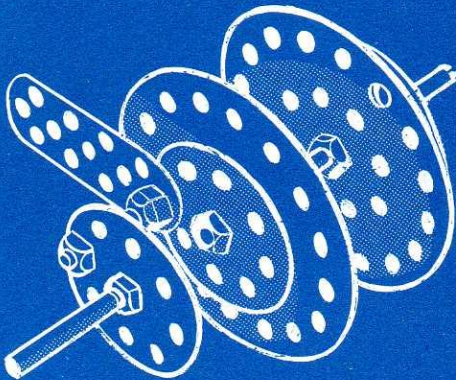


Fig. 2—Crankshaft

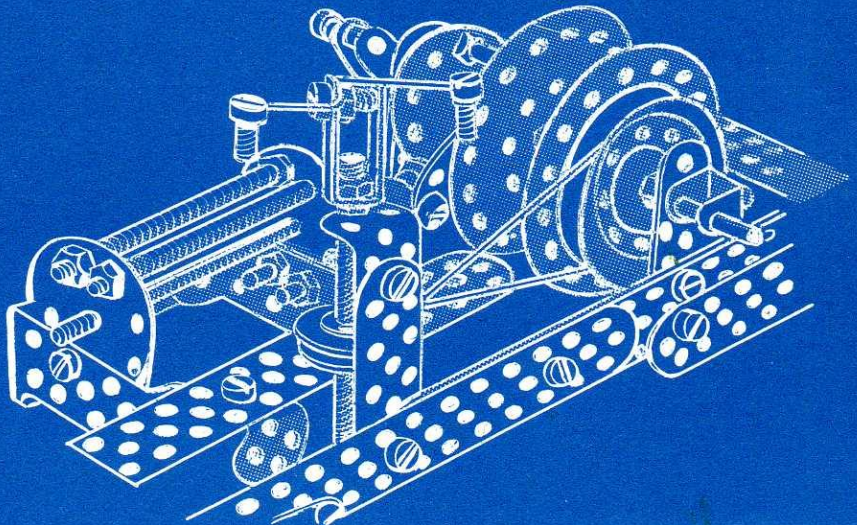


Fig. 3—Cutaway view



## 16. TRACTOR

made with Set No. 2 or Set No. 1 plus Extra-Pak Nos. 1, 2 and 3

SPECIFICATION					
Part No.		Part No.		Part No.	
A1	7	P29	3	U1	4
B1	49	P49	4	U2	4
F5	8	S25	2	U3	2
F9	2	S55	4	V35	4
F13	4	S87	2	W10	2
F17	4	SU1	2		
N1	92	SU2	2		

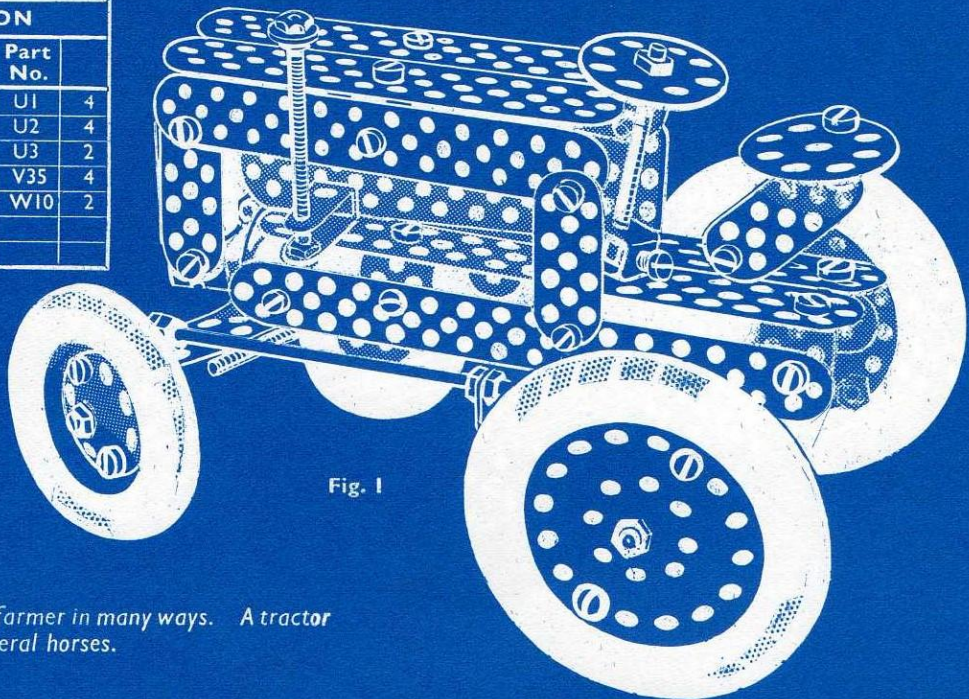


Fig. 1

### DESCRIPTION

*The engineer helps the farmer in many ways. A tractor will do the work of several horses.*

### CONSTRUCTION

Side members of chassis are made from two F17's, joined at front and rear by U2's, as shown. A P29 carrying an A1 is fixed to the front U2. Another U2 is attached to this A1 by an S25, which serves as the pivot for front axle bearing (U3).

Two F17's make the floor of chassis and are fixed to the rear U2, and near the front by U1's as shown in Fig. 2. Engine is represented by two F9's fixed to floor of chassis by a U1. Rear axle bearing consists of two S55's. Wheels SCD49.

Front wheels are SCD39, axles S25 and S55.

Radiator made of four F5's and one U2, is fixed by the outside F5's to the U2, in front of chassis.

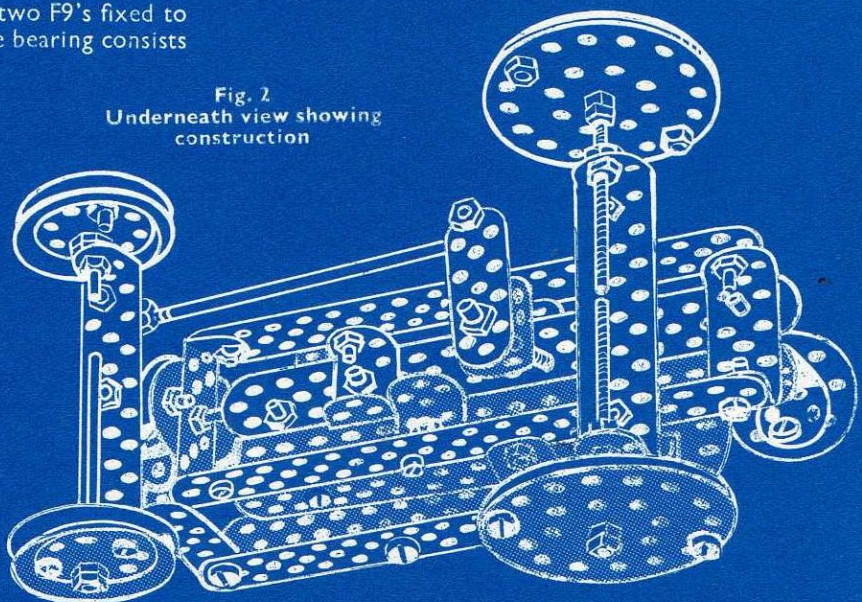
Each side of the bonnet is made from one F13 and one F5. Top (two F13's) is fixed by A1's bolted to the sides.

The Tyres, shown on this Model, have been included to illustrate their use with this particular model which, of course, can be made and used without them. They are available separately in Sup. Bag Nos. 14 and 15.

Steering column S87, with P29 as wheel, transmits the motion to front axle via an F5. Two SU1's and S87 as track rod. Steering column is located by an SCD24 (SU2 in place of the SU1) and U1 forms the lower bearing.

Add exhaust pipe and seat.

Fig. 2  
Underneath view showing construction





## 20. LETTER BALANCE

made with Set No. 2 or No. 1 Set plus Extra-Pak Nos. 1, 2, 4, 5 and 6



Fig. 2—View showing balance mechanism

SPECIFICATION			
Part No.		Part No.	
A1	1	N1	47
A9	2	P49	1
A18	2	S25	2
A27	2	S55	1
B1	24	S87	2
ER1	1	SU1	2
F5	3	SU2	2
F9	4	U1	2
F17	2	V35	4

### DESCRIPTION

*This system of levers and counterweights is often used in weighing machines. There are no springs to lose their tension.*

### CONSTRUCTION

The base is made from A9's and A18's, to which the vertical column (A27's) is joined by a U1 on an F9 crosspiece. Bracing is an F5 and F9 (overlapped three holes), attached to base by an A1.

Balance mechanism consists of two arms pivoting in vertical column and carrying on one side the rod to which platform is attached and on the other a balance weight.

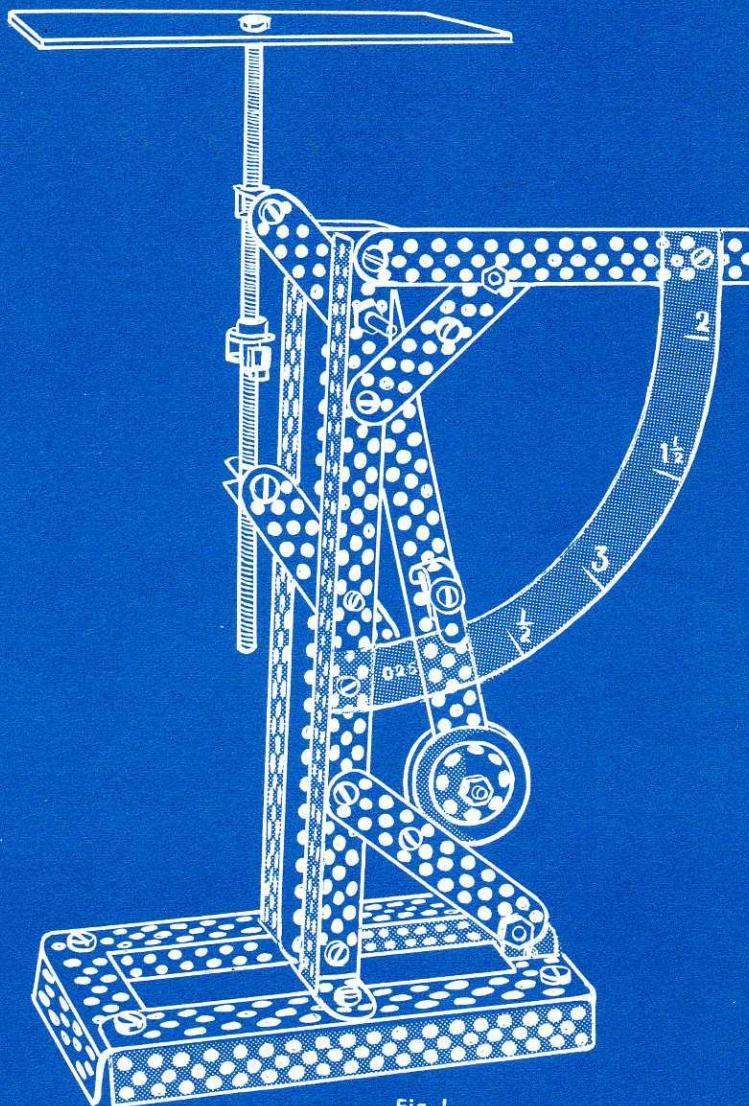


Fig. 1

Pivoting arms are F9's, the upper of which is fixed to an S55 and the lower to an S25. SCD13 in fourth centre hole is used in each case. Use SCD19 for the shafts, which pass through third and thirteenth centre holes, respectively, of vertical column. Scale arm is an F17 with four V35's as weight and is fitted securely to top pivot arm. An SU2 carries the pointer, spaced by an ER1. Other ends of pivot arms carry an SU1 and SU2, respectively, fixed by SCD25. Rod is two S87's joined by SCD26. Platform is fitted to a P49 fastened to top of rod.

Scale graduations are in  $\frac{1}{2}$  ozs.



# MODELS 19, 21, 33

## made with Set No. 2

or No. 19 with Set No. 1 plus Extra-Pak Nos. 4 and 5  
 No. 21 with Set No. 1 plus Extra-Pak Nos. 4, 5 and 7  
 No. 33 with Set No. 1 plus Extra-Pak Nos. 4, 5, 7 and 9

SPECIFICATIONS							
Part No.	Model			Part No.	Model		
	33	19	21		33	19	21
A1	1		1	E8	2	2	2
B1	12	7	12	E10	1	1	1
E1	1	1	1	F5	1		1
E2	1			F9	1	1	1
E3	1		1	N1	17	20	14
E4	1	1	1	S55	1	3	
E5	1	1	1	U2	2		2
E6	4	4	4	W10	1	5	1
E7		1		W16		2	

## DESCRIPTION

### BELL

*This simple but very interesting model demonstrates the principle upon which all Electric Bells are operated.*

### BELL KEY

*This is a convenient on and off switch for use in connection with your Trix models.*

## CONSTRUCTION

### 33 BELL (Fig. 1)

Circuit as in SEC5. The long brass strip E5, is slightly bent to touch the B1 in the insulating strip. Note that one end of the bobbin coil runs to the framework on the base, E1, held between a washer and a nut. The connecting coil, E10, is fixed to the bolt in the insulating strip, E8.

### 19 BELL KEY with combined Lever Switch (Fig. 2)

As can be seen from the illustration above, this is very simple but care must be taken to ensure that brass strip E5, secured to the insulator E8, is kept clear of the base E1. Use E4 as handle for switch.

To operate, move lever to left across E7 to close circuit. If only very short supply of current is necessary, press E5 to contact base E1.

### 21 BUZZER (Fig. 3)

Circuit as in SEC5. The long brass strip, E5, is slightly bent towards the bolt in the insulating strip. The soft iron core is screwed into the U2 and one end of the bobbin coil is connected to the framework between two nuts on the core. A W10 should be placed above these two nuts.

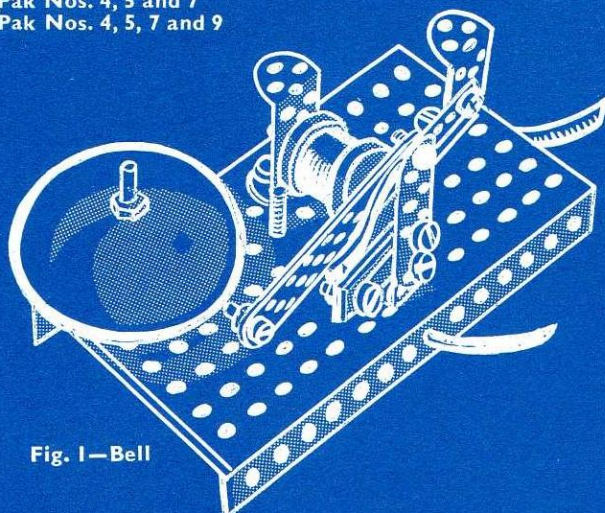


Fig. 1—Bell

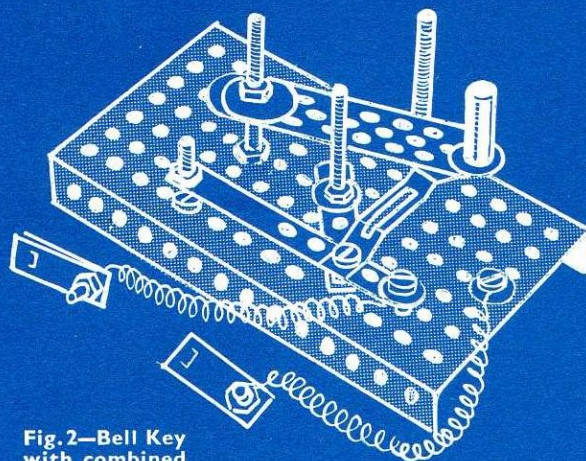


Fig. 2—Bell Key with combined Lever Switch

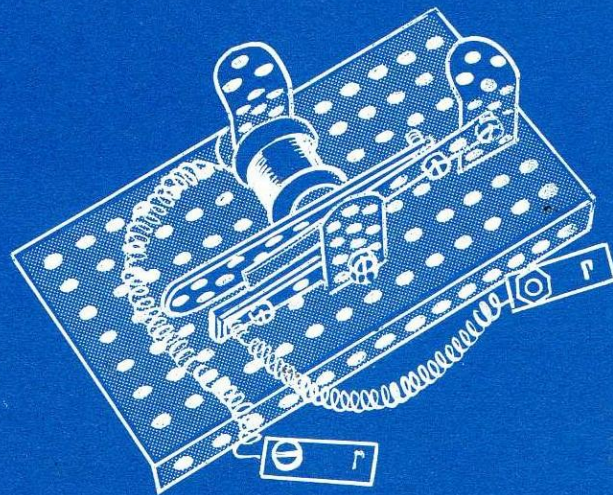


Fig. 3—Buzzer



# MODELS 22, 30, 32

## made with Set No. 2

or No. 22 with Set No. 1 plus Extra-Pak Nos. 4, 5 and 7  
 No. 30 with Set No. 1 plus Extra-Pak Nos. 4, 5, 7 and 8  
 No. 32 with Set No. 1 plus Extra-Pak Nos. 4, 5, 7, 8 and 9

SPECIFICATIONS											
Part No.	Model			Part No.	Model			Part No.	Model		
	30	32	22		30	32	22		30	32	22
A1		2	1	E7	1	1		F13	2	2	
B1	11	11	12	E8	2	2	2	N1	26	23	16
E1	1	1	1	E9		1		P29		4	
E3	1	1	1	E10	1	1	1	S55	3	1	
E4	1	1	1	E11	1	1		U2	2	2	2
E5			1	F5		1	1	W10	1	1	1
E6	4	4	4	F9	4	4	3				

### DESCRIPTION

Here are three further examples of simple electrical models each using a different construction.

### CONSTRUCTION

#### 30 MOTOR (Fig. 1)

The circuit as in SEC7, and the bobbin is fixed to the vertical framework in the fourth hole down. The top S55, to which the commutator is fixed and also the crossed F13's, run freely between lock nuts. The commutator brush is insulated from the framework by the fibre insulators, which are bolted to a U2. For cardboard disc, see template on page 96.

#### 32 ROUNDABOUT (Fig. 2)

Circuit as in SEC7. The framework consists of two sets of flat strips overlapped to 12 holes and held together by two U2's (which bear the crank axle E9), one in the top hole and the other in the fifth hole up. The commutator is secured on the crank axle, above the lower U2, between nuts, and the commutator brush is fixed on a bolt in the insulating strip. Locknuts should be placed at the end of the crank axle, thus allowing the shaft to move freely.

#### 22 SHOCKING COIL APPARATUS (Fig. 3)

In addition to the standard circuit SEC5 and construction used in the Buzzer (page 80), two further leads are required to be attached, one to the bolt holding the supply lead on the insulating piece E8 and the second earthed to the frame. Weak, but clear, electric shocks may be felt, by holding an F9 in each hand, particularly if the hands are moist.

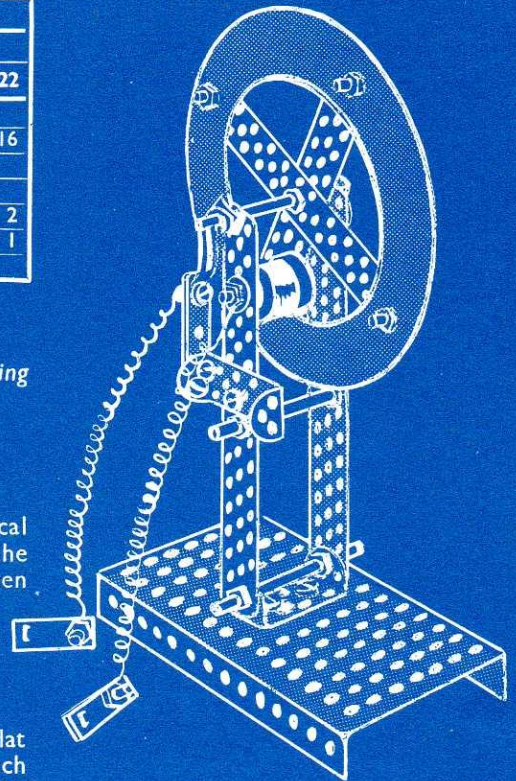


Fig. 1—Motor

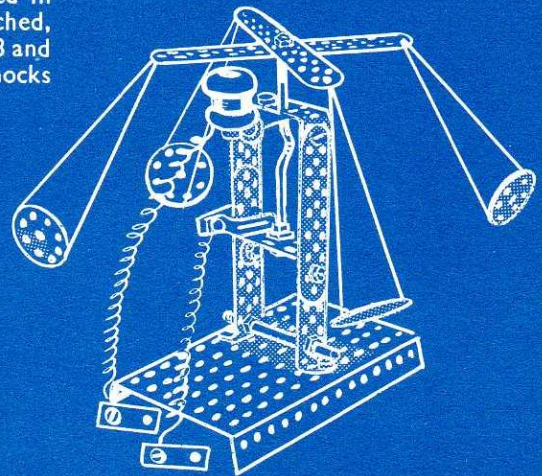


Fig. 2—Roundabout



Fig. 3—Shocking Coil Apparatus



## 23. MORSE TELEGRAPH

made with Set No. 2 or Set No. 1 plus Extra-Pak Nos. 4 and 7

SPECIFICATION			
Part No.		Part No.	
A1	2	F9	4
B1	12	F13	2
E1	1	N1	18
E3	1	S55	2
E6	4	U2	2

### DESCRIPTION

*This Morse telegraph enables messages to be read by watching the movements of the needle.*

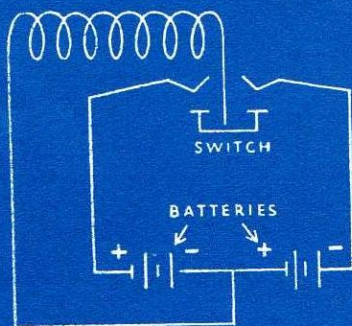


Fig. 2—Wiring diagram for switch

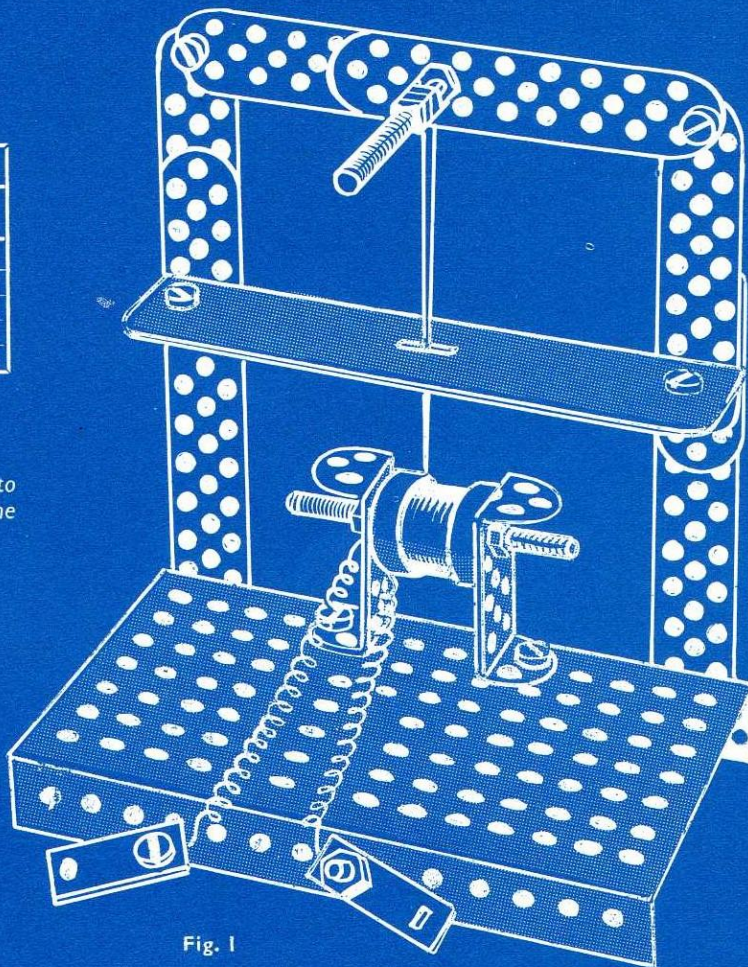


Fig. 1

### CONSTRUCTION

Make the frame using an E1, two F13's and four F9's as illustrated. Two A1's bolted to the uprights carry stiff paper or card with a cut out to accommodate the needle suspended from the top centre of the frame. The bobbin E3 is secured between two U2's by an S55 and N1's.

The needle should be magnetised and this is done by placing the needle inside the coil and passing current through the wire. In a few moments the needle will be magnetised.

When the model is connected to a battery the needle will be attracted to one side. By reversing the leads it will be attracted to the opposite side. By using a switch and two batteries the speed of these changes can be increased. In this arrange-

ment the two outer wires of the switch are connected to the positive and negative terminal of each battery and the centre contacts joined to one end of the coil. The other positive and negative terminals of the batteries are connected and joined to the other end of the coil. Thus by pressing either of the contacts the direction of current passing through the coil can be reversed.

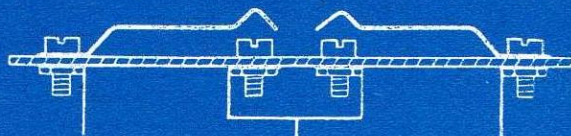


Fig. 3—Diagram showing switch construction



## 24. ELECTRIC MOTOR HORN

made with Set No. 2 or Set No. 1 plus Extra-Pak Nos. 4, 5 and 7

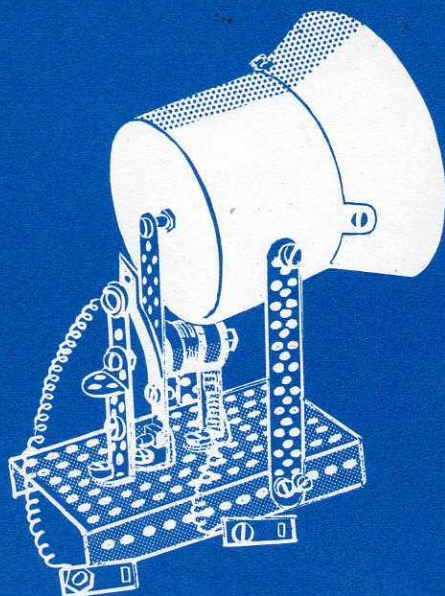


Fig. 1

### SPECIFICATIONS

Part No.	Fig. 24	Fig. 52	Part No.	Fig. 24	Fig. 52	Part No.	Fig. 24	Fig. 52	Part No.	Fig. 24	Fig. 52
A1	2	8	E5	1		F9	1	4	S25		1
B1	22	31	E6	4	4	F13	2	2	S55		3
E1	1	2	E8	2	2	F17		1	U1		1
E3	1	2	E10	1	2	N1	23	45	U2	1	2
E4	1		F5	2	2	P29		3	W10	2	2

### DESCRIPTION

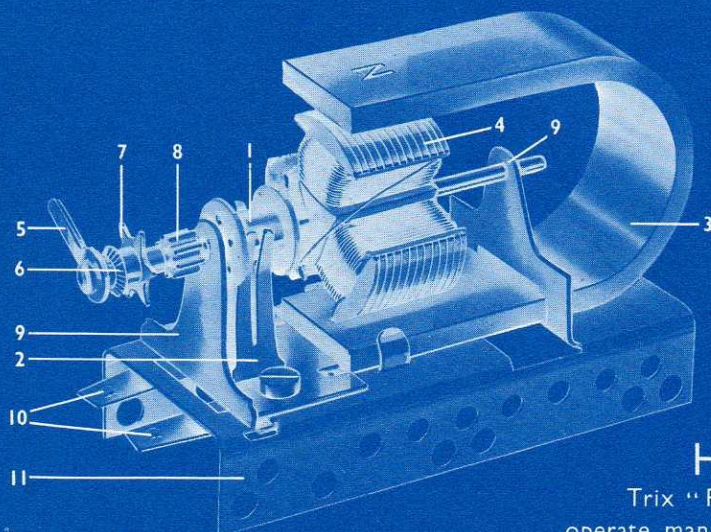
A working model of a typical motor car electric horn.

### CONSTRUCTION

The working of this model is the same as in the bell and buzzer described in SEC5.

For the sound box of the horn, use an empty tin. Pierce the bottom of the tin and insert a B1, to take the vibrations of the striking hammer. A cardboard cone is then fixed to the open end of the tin by means of bolts and nuts as illustrated. The trembler and hammer should be carefully adjusted to strike the bolt at the end of the sound box.

## 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.

ASK your hobby dealer for full details and price.

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.



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