MECCANO Dumper Truck

(MODEL No. 10.9)

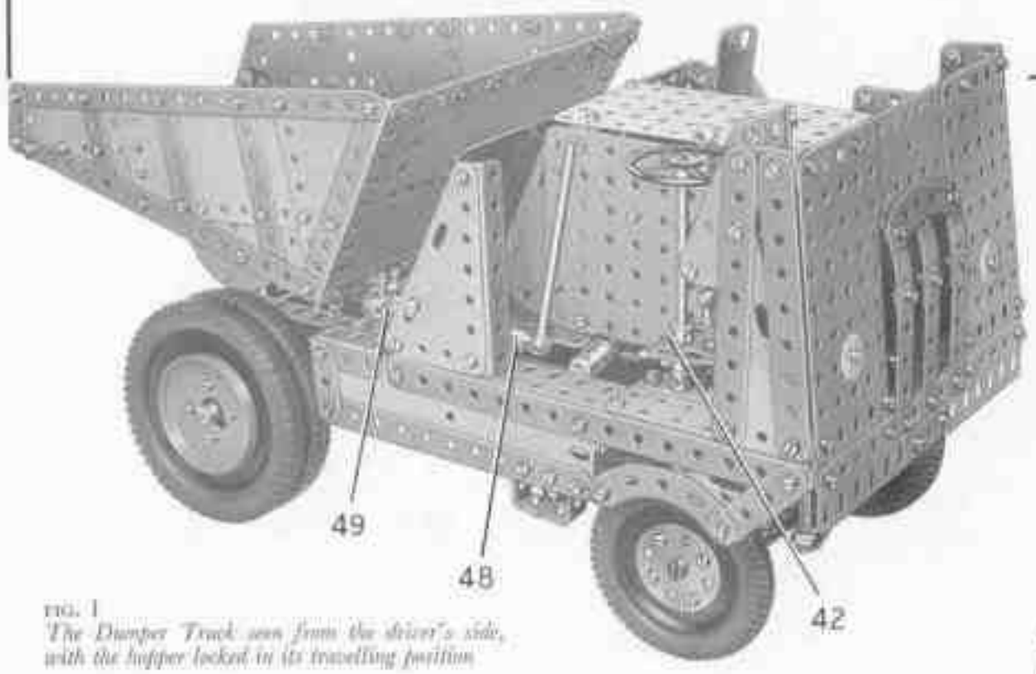


FIG. 1
The Dumper Truck seen from the driver's side, with the hopper locked in its travelling position

The model described in this Leaflet represents one of the mobile trucks used in constructional work for removing spoil from building sites. It is known as a Dumper Truck, and is fitted with a hinged hopper body that can be tipped to unload its contents. The model is equipped with a neat gear-box, attractive working steering gear, differential and swivelling seats for the driver and his mate, and it is powered by a Meccano E15R type Electric Motor.

Construction of the Model: The Chassis (Fig. 3)

Each side-member consists of two 12½" Angle Girders and a 12½" Flat Girder bolted together to make a channel section girder. The side-members are connected at each end by two 2½" × ½" Double Angle Strips, and a similar Double Angle Strip (1) is fixed between the girders (Fig. 3).

Driving Axle and Differential (Figs. 3, 4 and 5)

The driving axle unit is shown removed from the chassis in Fig. 4. Each half of the axle casing is made by bolting two 1½" × ½" Double Angle Strips between a Boiler End and a Wheel Disc (six holes). When the differential mechanism is assembled the Boiler Ends are joined together by two 2" Strips, and bolts passed through two of the Double Angle Strips are bolted to the chassis.

A 4½" Rod is passed through one side of the casing, and on it a 1½" Contrate (2) is free to rotate. A ¾" Contrate (3) is fixed on the Rod, which is then passed into the bore of a Coupling (4). Two 1" Screwed Rods are held by nuts in the Contrate (2), and on each of them a Collar is screwed. A 1½" Rod is fixed in these Collars and also in the centre cross hole of the Coupling. Two ¾" Pinions are free to rotate on Pivot Bolts screwed into the Coupling (4). These Pinions engage the Contrate (3) and a similar Contrate on a 3½" Rod that is passed through the other half of the axle casing. The differential unit is spaced inside the casing by Washers, so that a ½" Pinion (5) on a 2" Rod meshes with the Contrate (2). The 2" Rod is supported in a Fishplate bolted to the Double Angle Strip (1).

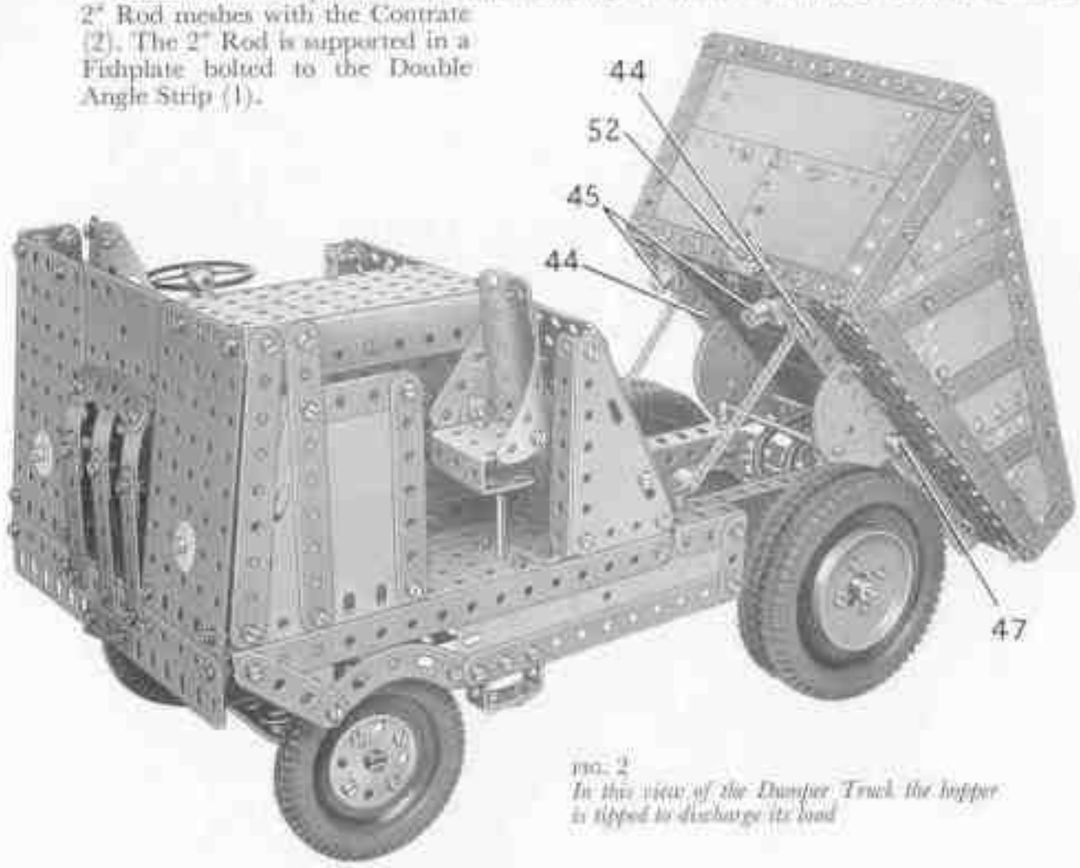


FIG. 2
In this view of the Dumper Truck the hopper is tipped to discharge its load

Details of the Gear-box (Figs. 3 and 5)

The gear-box frame consists of two 3" × 1½" Double Angle Strips (6) (Fig. 3) fixed together by their lugs, with a 1½" Flat Girder bolted, through its slotted holes, to each end of the assembly. At one end a 2½" × 1" Double Angle Strip bolted to the chassis is held by the same bolts as the Flat Girder, and a Double Bent Strip (7) is fixed to the Flat Girder. At the opposite end a 2½" Strip is attached by the same bolts as the Flat Girder, and is connected to the chassis by Angle Brackets. A 1" × 1" Angle Bracket (8) is fixed to one side of the gear-box frame.

The gear-box driving shaft is a 3" Rod that carries a ½" Pinion (9) (Fig. 5) and a ½" Pinion (10). The Rod is held in place by a Collar, and projects about ½" beyond the Pinion (10) into the bore of a ½" Pinion (11) on the output shaft. This shaft is a 2" Rod supported in one end of the frame and in the Angle Bracket (8), and it carries also a ¾" diam. × ½" face Pinion (12).

The layshaft is a 3½" Rod mounted as shown in Fig. 3, and it carries a ½" Pinion (13), a Collar, and a ½" Pinion (14) (Fig. 5.) The reverse ½" Pinion (15) is free to turn on a 1½" Rod fixed in a Coupling (16). The Pinion is held on the Rod by a Spring Clip, and is spaced from the Coupling by five Washers. The Coupling is screwed tightly on to a ½" Bolt passed through one end of the gear-box frame, but is spaced from the frame by a Washer. The position of the Coupling (16) is arranged so that Pinion (15) can be meshed with both Pinions (9) and (13).

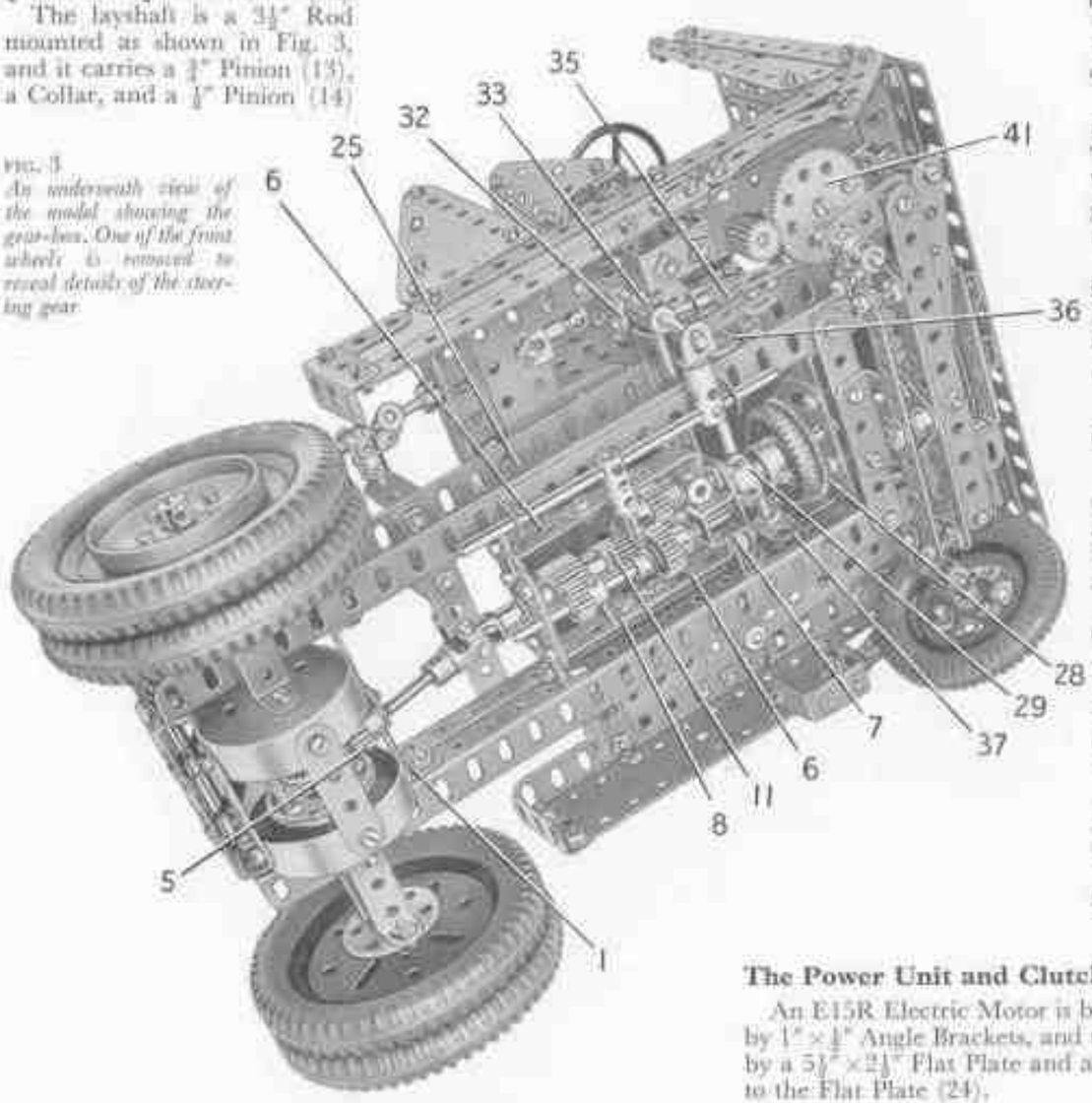


FIG. 3
An underneath view of the model showing the gear-box. One of the front wheels is removed to reveal details of the steering gear.

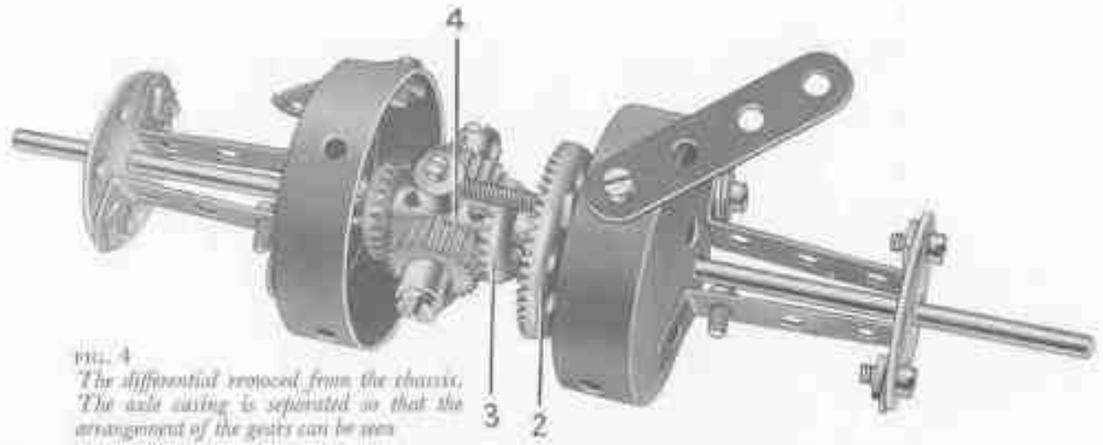


FIG. 4
The differential removed from the chassis. The axle casing is separated so that the arrangement of the gears can be seen.

The gear ratio required is obtained by sliding the layshaft, the movement of which is controlled by a Rod and Strip Connector fitted over the 3½" Rod between the Pinion (13) and the Collar. The Rod and Strip Connector is joined by a 1" Rod to a Coupling that is fixed on a 5" Rod sliding in a 3½" × ½" Double Angle Strip bolted to the chassis. A Threaded Coupling (17) is fixed on the 5" Rod.

Construction of the Body (Figs. 2, 5 and 7)

The base frame of the body consists of four 7½" Angle Girders arranged in the form of a square. Two 5½" × 2½" Flat Plates (18) and two 3" × 1½" Flat Plates (19) and (20) are bolted to the frame (Fig. 7), and a 2½" × 1½" Flexible Plate is fitted in front of the Plate (20). A 3½" Flat Girder is fixed between the Flexible Plate and the Plate (19), and a 4½" Flat Girder (21) (Fig. 5) is bolted centrally to the rear end of the frame.

Two 5½" Angle Girders (22) (Fig. 7) are bolted to the Plates (18) and to the Flat Girder (21). A 5½" × 2½" Flat Plate (23) is attached by Fishplates to one of the Girders (22), and a 5½" × 3½" Flat Plate (24) is attached by Angle Brackets to the second Girder.

The division between the engine and the dumper hopper consists of two 5½" × 3½" Flat Plates attached by Angle Brackets to two 3½" × 2" Triangular Flexible Plates. Each of the Triangular Flexible Plates is strengthened by a 3½" Angle Girder, and is bolted to a 2" Angle Girder fixed to the base frame.

On the driver's side two 4½" Strips and a 3½" × 1½" Triangular Flexible Plate are bolted to a 1½" Angle Girder fixed to the base frame. On the other side two 4½" Strips and a 3½" × 2½" Triangular Flexible Plate are bolted to a 3" Angle Girder.

The body is attached to the chassis by two Double Bent Strips at the rear (Fig. 5), and by Double Brackets held by bolts (25).

The Power Unit and Clutch (Figs. 3, 5 and 7)

An E15R Electric Motor is bolted by its flanges to Flat Plate (23) (Fig. 7). The Motor is connected to Flat Plate (24) by 1" × ½" Angle Brackets, and to one of the Girders (22) by ½" × ½" Angle Brackets. A cover over the Motor is provided by a 5½" × 2½" Flat Plate and a curved 5½" × 2½" Flexible Plate bolted together. The cover is pivoted on Hinges bolted to the Flat Plate (24).

A Worm fixed to the lower end of the Motor shaft drives a ½" Pinion on a 2½" Rod (26) (Fig. 5). This Rod is supported in two Flat Trunnions, one of which is bolted to a 2½" × ½" Double Angle Strip and the other to a 2½" × 1" Double Angle Strip. A ½" Pinion drives a 57-tooth Gear (28) on a 2½" Rod mounted in the Double Angle Strips.

A 1" Pulley fitted with a Motor Tyre is gripped in one end of a Socket Coupling (29). The Socket Coupling is free to slide on the gear-box input shaft, but is made to turn with the shaft by a bolt screwed into a Collar (30). This Collar is spaced from the gear-box by three Washers, and its bolt engages the slot in the Socket Coupling. A Compression Spring fitted between the Collar and the Socket Coupling presses the Motor Tyre against the Gear (28).

Arrangement of the Driving Controls (Figs. 5 and 7)

The gear-change lever is a 3½" Rod, fixed in a Handrail Support *lock-nutted* to Flat Plate (24) (Fig. 7). A Swivel Bearing (31) is fixed on the lower end of the lever, and is joined by a 1" Rod to a Rod and Strip Connector. A Pivot Bolt is passed through the Rod and Strip Connector and is fixed in a Coupling (32). This Coupling is fitted to a 1" Rod that is held in a Coupling (33) (Fig. 5). This Coupling is carried by a 2" Rod supported in one of the chassis side-members and in a 1" × ½" Angle Bracket bolted to the top flange of the side-member. The 2" Rod is held in place by a Collar. A 1½" Rod (34) fixed in the Coupling (33) engages the slotted hole of an Angle Bracket, which is pivoted on a bolt fixed by a nut in the Threaded Coupling (17).

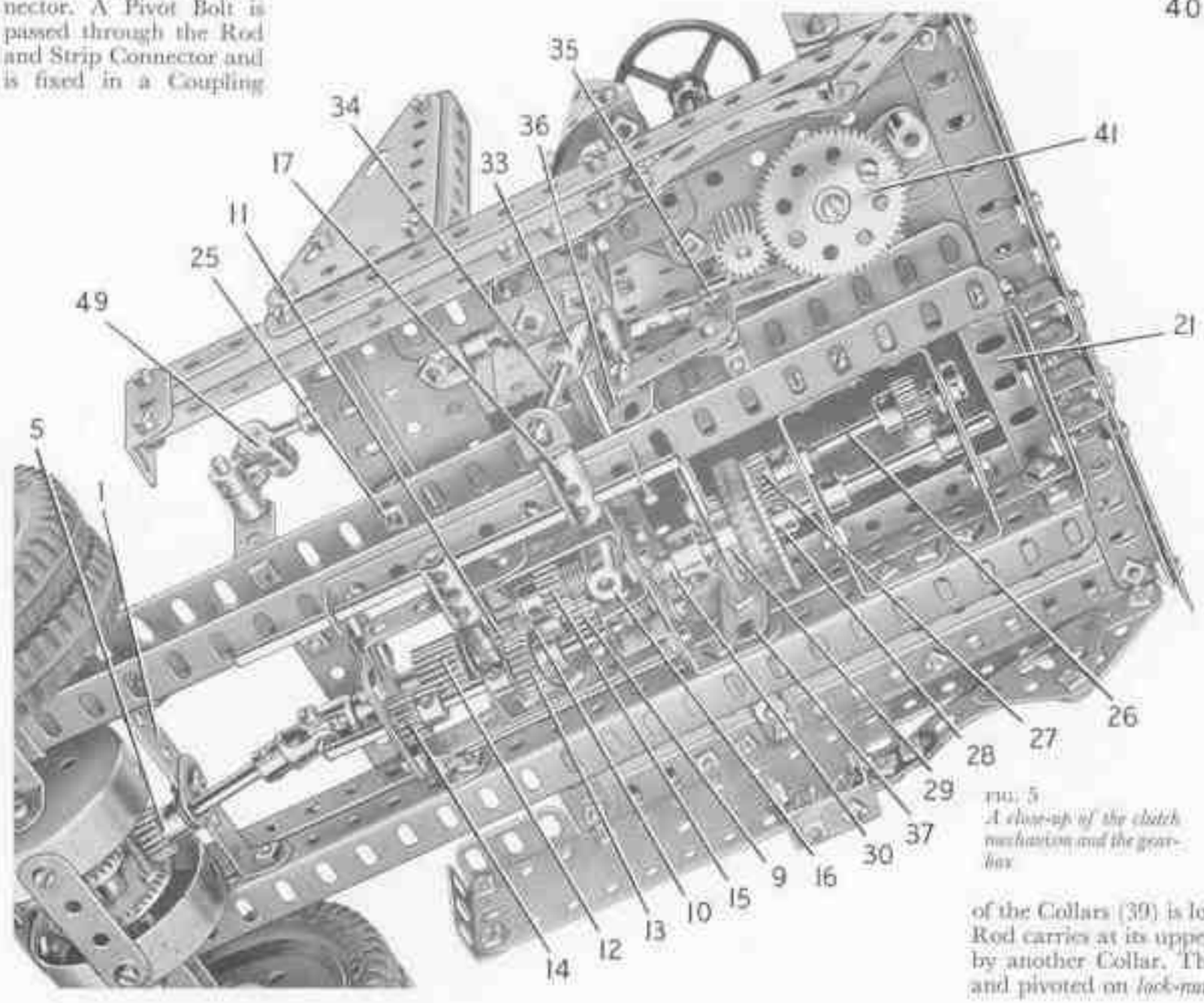
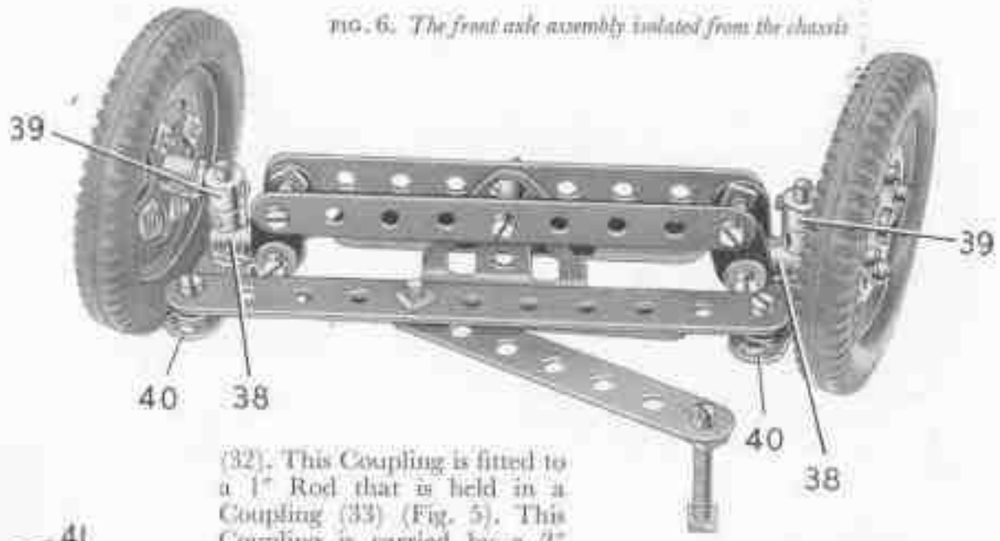


FIG. 5
A close-up of the clutch mechanism and the gear-box

FIG. 6. *The front axle assembly isolated from the chassis*



The clutch pedal is formed by a Threaded Boss held by a bolt in the short lug of a 1" × ½" Angle Bracket. The Angle Bracket is bolted to one arm of a Bell Crank (35) (Fig. 5), which is fixed on a 1" Rod. The 1" Rod is passed through a Handrail Support attached by its shank to the top flange of the chassis, and the Rod is held in place by a Collar. A 1½" Strip is *lock-nutted* to the other arm of the Bell Crank, and is *lock-nutted* also to a Crank (36) fixed on a 4½" Rod mounted across the chassis. A Crank (37) on this Rod is fitted with a ¾" Bolt that engages the groove of the Socket Coupling (29).

The Steering Mechanism (Figs. 3, 5, 6 and 7)

The front axle is supported by Trunnions attached to four 3½" Strips. These Strips are arranged in pairs, each pair consisting of two Strips placed face-to-face, and they are bolted to the chassis. The axle beam is made from two 4½" Strips, which pivot on a ¾" Bolt *lock-nutted* in the Trunnions. A Collar and a Washer are placed on the Bolt between the Trunnions, and a Washer is fitted between each 4½" Strip and the corresponding Trunnion. Fishplates are fastened to the ends of the 4½" Strips, and a Coupling (38) is fixed by two bolts to the Fishplates at each end (Fig. 6).

The front wheels are free to turn on Pivot Bolts, which are fitted with nuts and are then screwed into Collars (39). The nuts are tightened against the Collars to fix the Pivot Bolts in place. Each of the Collars (39) is locked on a 1½" Rod mounted freely in one of the Couplings (38). The Rod carries at its upper end a Crank (40), and the Collar (39) is spaced from the Coupling by another Collar. The Cranks (40) are connected by two 5½" Strips placed face-to-face and pivoted on *lock-nutted* bolts.

The steering column is a 4½" Rod mounted in a Double Arm Crank bolted to Flat Plate (20) (Fig. 7). The Rod is held in place by a ½" fixed Pulley placed above the Crank, and below the Flat Plate it is fitted with a ½" diameter × ½" face Pinion. This Pinion engages a 57-tooth Gear (41) (Fig. 5), which is freely mounted on a ½" Bolt held by two nuts in the Flat Plate (20). A 3½" Strip is *lock-nutted* on a 1½" Bolt fixed in a Threaded Boss, attached to a Fishplate bolted to Gear 41. The other end of the Strip is *lock-nutted* to the 5½" Strips attached to the Cranks (40) (Fig. 6).

The driving seat is made by attaching a 2½" × 1½" Flexible Plate and two 2½" × 1½" Triangular Flexible Plates to a Flat Trunnion by Angle Brackets. A 1½" Strip is connected to the Flat Trunnions by an Obtuse Angle Bracket, and to a second Flat Trunnion (42) (Fig. 1) by another Obtuse Angle Bracket. Flat Trunnion (42) is passed over the steering column and is held in place by the 'spider' from a Swivel Bearing.

The seat for the second man is formed by a 2½" × 1½" Flexible Plate and two 2½" × 2" Triangular Flexible Plates attached by Angle Brackets to a Bush Wheel and a Channel Bearing (see Fig. 2). A 2½" Rod fixed in the Bush Wheel is held in a Double Arm Crank bolted underneath the body.

The Tipping Hopper (Figs. 1, 2 and 7)

The floor of the hopper is formed by three 4½" × 2½" Flexible Plates and two 2½" × 1½" Flexible Plates, extended on each side by a 5½" × 1½" and a 2½" × 1½" Flexible Plate. The floor is strengthened by five 7½" Strips bolted to the Plates on the inside, and along the front edge are bolted a 4½" and a 3½" Flat Girder overlapped three holes. Two built-up girders (44) (Fig. 2), each made from a 5½" and a 2½" Angle Girder, are bolted to the underside of the floor.

Each side of the hopper consists of a 3½" × 2½" Triangular Flexible Plate, two 2½" × 1½" Triangular Flexible Plates, a 4½" × 2½" Flexible Plate and a 5½" × 1½" Flexible Plate. The Plates are strengthened by Strips and are connected to the hopper floor by Angle Brackets.

Two Semi-Circular Plates placed face-to-face are bolted to each of the girders (44), and they pivot on a 4" Rod held in Handrail Supports fixed to the chassis. Two short lengths of Sprocket Chain are hooked through holes in the girders (44), and are looped over Cord Anchoring Springs screwed into holes in the chassis. Two Rod Sockets (45) (Fig. 2) are fixed to Angle Brackets bolted to the girders (44). Two Tension Springs (46) (Fig. 7) are bolted to the front of the chassis, and are passed over a 4½" Rod (47) (Fig. 2).

The hopper locking lever is a 3½" Rod held in a Handrail Coupling (48) (Fig. 1). The Handrail Coupling is fixed on a 3" Rod supported in the front 7½" Angle Girder of the body, and in an Angle Bracket bolted to Flat Plate (19) (Fig. 7). At its front end the 3" Rod carries a Coupling (49), which is fitted with a Centre Fork. The Centre Fork is located between two ⅜" Bolts, each of which is screwed into one half of a Dog Clutch on a 3½" Rod (50). This Rod is mounted in 1" × 1" Angle Brackets bolted to a 3½" Strip fixed across the chassis. A Compression Spring is placed on Rod (50) between one of the Angle Brackets and a Collar (51). A ⅜" Bolt is screwed into the Collar and bears against the edge of the 3½" Strip to ensure that the ⅜" Bolts in the Dog Clutch remain in engagement with the Centre Fork. The end of Rod (50) passes into an Angle Bracket (52) (Fig. 2), which is spaced from the back of the hopper by a Collar on a ½" Bolt.

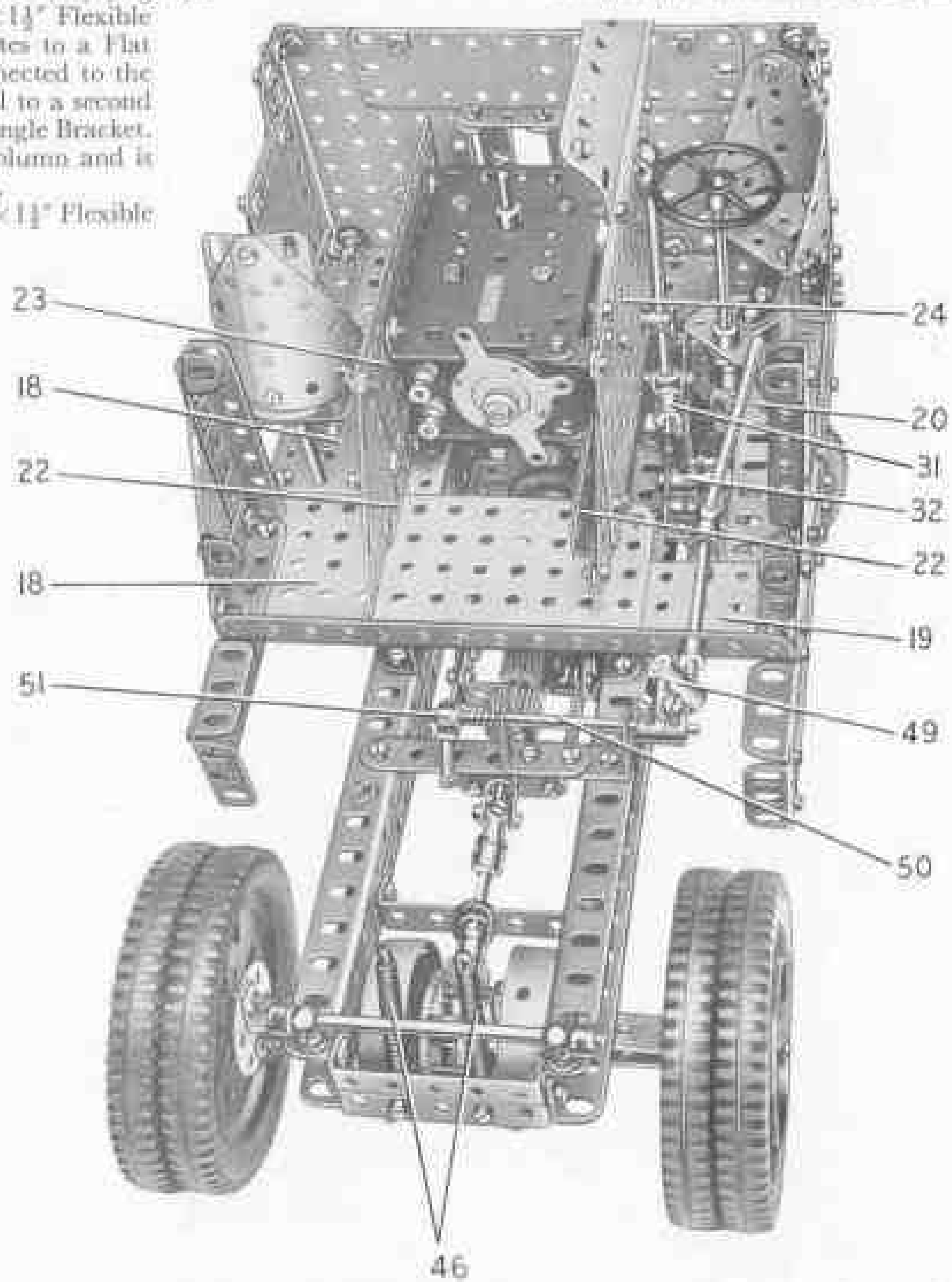


FIG. 7. *An end view of the Dumper Truck, with the hopper and the front of the body removed to show how the E15R Electric Motor is mounted in place*

Parts required to build the Meccano Dumper Truck

2 of No.	1a	1 of No.	26a	2 of No.	120b
6 „ „	1b	2 „ „	27a	2 „ „	126
9 „ „	2	1 „ „	28	4 „ „	126a
8 „ „	2a	2 „ „	29	1 „ „	128
11 „ „	3	1 „ „	32	2 „ „	133
15 „ „	5	1 „ „	35	2 „ „	133a
8 „ „	6	356 „ „	37a	4 „ „	136
10 „ „	6a	331 „ „	37b	2 „ „	136a
4 „ „	8	63 „ „	38	2 „ „	137
4 „ „	8b	2 „ „	38d	1 „ „	140
4 „ „	9	2 „ „	43	2 „ „	142a
2 „ „	9a	3 „ „	45	4 „ „	142b
2 „ „	9b	2 „ „	46	1 „ „	142c
1 „ „	9c	2 „ „	47a	1 „ „	144
2 „ „	9d	4 „ „	48	5 „ „	147b
2 „ „	9e	6 „ „	48a	1 „ „	160
5 „ „	9f	1 „ „	48b	2 „ „	162a
15 „ „	10	3 „ „	52a	2 „ „	165
2 „ „	11	2 „ „	53a	1 „ „	171
30 „ „	12	25 „ „	59	2 „ „	176
7 „ „	12a	4 „ „	62	2 „ „	179
6 „ „	12b	2 „ „	62b	1 „ „	185
2 „ „	12c	8 „ „	63	8 „ „	188
1 „ „	15	1 „ „	63c	8 „ „	189
4 „ „	15a	2 „ „	64	3 „ „	190a
1 „ „	15b	1 „ „	65	2 „ „	191
5 „ „	16	4 „ „	70	5 „ „	192
3 „ „	16a	2 „ „	73	2 „ „	212
2 „ „	16b	2 „ „	82	4 „ „	214
3 „ „	17	1 „ „	90	3 „ „	215
5 „ „	18a	2 „ „	90a	6 „ „	221
4 „ „	18b	1 „ „	94	2 „ „	222
4 „ „	19b	2 „ „	103b	2 „ „	223
2 „ „	20a	2 „ „	103c	2 „ „	224
1 „ „	22	2 „ „	103d	2 „ „	225
1 „ „	23a	2 „ „	103h	2 „ „	226
1 „ „	24	1 „ „	103k		
2 „ „	24a	4 „ „	111		
2 „ „	24c	4 „ „	111a	1 E15R	
4 „ „	25	10 „ „	111c	Electric Motor	
1 „ „	25a	1 „ „	111d	(not included	
7 „ „	26	2 „ „	114	in Outfit)	

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