By Spanner

Build this exciting model

TO most people, mention of a coal wagon conjures up visions of the flat-bed vehicles on which local coal merchants deliver household fuel in hundredweight sacks. There are big industrial wagons that carry several tons of loose coal to factories and power stations where it is stored in large quantities ready for use. As a result, special wagons have been designed which feature a built-in conveyor belt to facilitate speedy unloading and the Meccano model described here is based on such a machine.

Motive power for both the conveyor belt and the lorry, itself, is supplied by an E15R Electric Motor, mounted in the cab. You will see, incidentally, that an extension conveyor has been included. This does not actually operate, but is intended simply as a show-piece. To help in construction I have split the model into various sections as follows:

Chassis

The mainframe is constructed from two 24½ in. 'U' Girders, each built up from two 24½ in. Angle Girders 1 and 2 joined by a 21½ in. compound flat girder obtained from a 12½ in. and a 9½ in. Flat Girder. The flat girder is positioned so that its front end lies a distance of six holes from the front of the Angle Girders. Both 'U' girders are then connected by two 5½ in. Angle Girders 3.

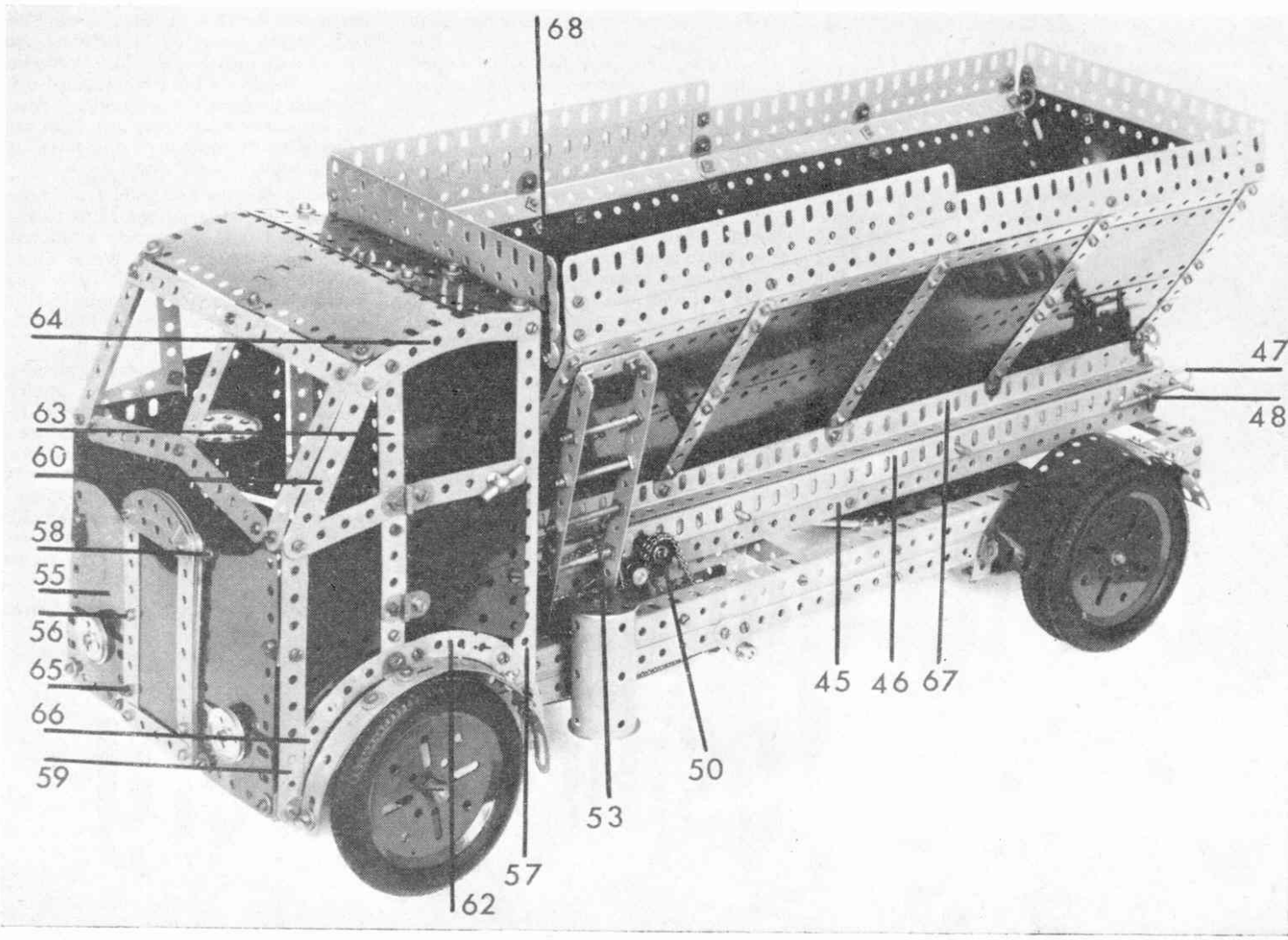
A 5½ in. Angle Girder 4 and two 7½ in. Strips 5, are fixed to Girders 2 by ¾ in. Bolts, but are spaced from them by three Washers and a Collar on the shank of each Bolt.

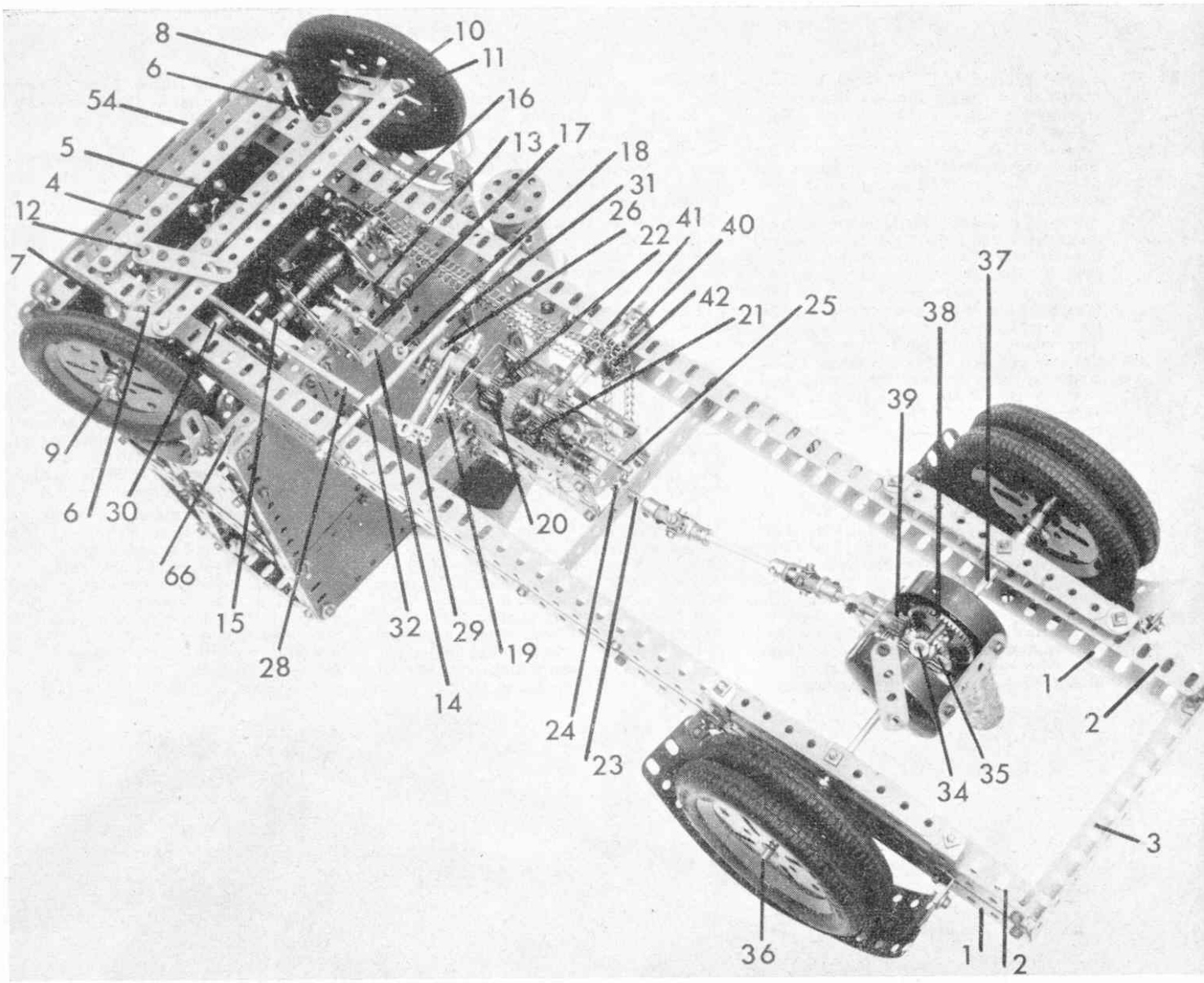
At each end of Strip 5 is bolted a Crank 6 supporting a 1½ in. Rod 7. Mounted on this Rod, in turn, is a Crank 8 and a Short Coupling. A 1½ in. Rod 9, carrying a 3 in. Pulley with Tyre 10 between two Collars, is fixed, then a 7½ in. Strip 11 is lock-nutted to Cranks 8. Two 1 in. Corner Brackets are bolted to the Angle Girders 1 and 2 to serve as bearings for a 6½ in. Rod 12 carrying a Crank extended by a 2 in. Slotted Strip and a 1½ in. Pulley with Tyre. A ⅜ in. Bolt is attached to the 7½ in. Strip by a Nut so that its shank engages in the slot of the 2 in. Slotted Strip. A Collar on each side of the Corner Bracket holds Rod 12 in position.

Power unit and gearbox

An E15R Electric Motor is bolted to Angle Girder 4 and Strip 5. The Motor side plates are extended by 1½ in. Corner Brackets 13 to which 1½ in. Strips, connected by 1½ in. by 1½ in. Double Angle Strips 14, are bolted. A ⅜ in. Pinion on the Armature shaft meshes with a 57-teeth Gear Wheel on a 3 in. Rod 15 that carries a Worm and a ¾ in. Sprocket Wheel 16. A 1½ in. Pinion on a 3½ in. Rod 17, journalled in Double Angle Strip 14, engages with the Worm. Also mounted on Rod 17 is a Short Coupling 18, with a ½ in. Bolt in its bore, and a Socket Coupling, a Compression Spring between the two. A 1 in. Pulley with Rubber Ring is fastened in the Socket Coupling, but is free to turn. The ½ in. Bolt in the Short Coupling drives the Socket Coupling.

Two rectangles, built from 3½ in. and 1½ in. Strips, are joined together by six 1½ in. by ½ in. Double Angle Strips, three at the front, one through the third





holes in the lower $3\frac{1}{2}$ in. Strips and two at the back. Note, however, that the lugs of the centre Double Angle Strip are spaced from the Strips by a Washer. The whole arrangement is held in the chassis by two $5\frac{1}{2}$ in. by $\frac{1}{2}$ in. Double Angle Strips, bolted to the uppermost $1\frac{1}{2}$ in. by $\frac{1}{2}$ in. Double Angle Strips and the Angle Girders 1.

A $2\frac{1}{2}$ in. Rod, carrying a Bush Wheel 19 pressed against the above-mentioned Rubber Ring, also carries a $\frac{1}{2}$ in. Pinion 20 and a 1 in. Gear Wheel 21, the Rod extending only half-way into the bore of the latter. Loosely mounted in the other half of the bore is a 3 in. Rod 23, journalled in the Double Angle Strip and held by Collar 24, that carries a 57-teeth Gear and a 50-teeth Gear. A $\frac{1}{2}$ in. Pinion 22 is mounted on a $\frac{3}{4}$ in. Bolt secured to the centre front Double Angle Strip.

The sliding lay-shaft is a $4\frac{1}{2}$ in. Rod 25, on which is fixed a $\frac{1}{2}$ in. Pinion, a 1 in. Gear Wheel, another $\frac{1}{2}$ in. Pinion, a $\frac{3}{4}$ in. Pinion and a Collar. A Socket Coupling 26 is fastened to a Collar at the end of the Rod. By placing the Gears and Pinions as shown you will have two forward speeds and one reverse, as well as a neutral position.

A gear selection lever is obtained from a $4\frac{1}{2}$ in. Strip, which is lock-nutted to an Angle Bracket held by Bolt 27. A Collar on the end of a $6\frac{1}{2}$ in. Rod 28 is pivotally connected to the Strip by a Bolt passed through the second hole from the bottom of the Strip into one of its tapped bores. Mounted on the Rod is a Coupling 29 that supports a 2 in. and a $2\frac{1}{2}$ in. Rod which engage one each side of Socket Coupling 26.

The clutch pedal is represented by a Crank 30, with two Angle Brackets in the shape of a 'T' bolted through the end hole. Fixed on a $6\frac{1}{2}$ in. Rod 31, journalled in 1 in. Triangular Plates bolted to Angle Girders 2, are another two Cranks 32 and 33. Cranks 30 and 32 are then connected by a $4\frac{1}{2}$ in. Strip, lock-nutted through the second hole in Crank 30 and the first hole in Crank 32. Crank 33 carries an Adaptor for Screwed Rod which engages with the Socket Coupling on Rod 17. The Clutch Pedal 30 pivots on an adaptor.

Conveyor belt

A $2\frac{1}{2}$ in. Rod 40, journalled in a 1 in. Corner Bracket and the gearbox side carries a $\frac{3}{4}$ in. and a 1 in. Sprocket Wheel 41 and 42. Sprocket Wheel 42 is connected to Sprocket Wheel 16 by Chain.

Two $18\frac{1}{2}$ in. Angle Girders 43 are bolted to Angle Girder 3 and a $5\frac{1}{2}$ in. Strip 44 and are then extended by $9\frac{1}{2}$ in. Flat Girders 45, to which an $18\frac{1}{2}$ in. Angle Girder 46 is bolted. Note that this Angle Girder is spaced from the Flat Girders by two Washers on the shank of each bolt. Two 2 in. Slotted Strips 47 are bolted at the rear, then two Threaded Bosses 48 are added, as shown. A 2 in. Screwed Rod, used to tighten the belt, is fitted into the transverse tapped bores of both these Threaded Bosses. Four rollers are built up from two $\frac{3}{4}$ in. Flanged Wheels and a Sleeve Piece. The rear-most one is mounted on a 4 in. Rod 49 held by Collars, while the remainder are placed on $3\frac{1}{2}$ in. Rods. A $\frac{3}{4}$ in. Sprocket Wheel on a 4 in. Rod 50, journalled in Girders 45, is connected to Sprocket Wheel 41 by Sprocket Chain. Also fixed on Rod 50 is a $\frac{1}{2}$ in. Pinion 51, which meshes with a 57-teeth Gear on another 5 in Rod 52. This Rod, in turn, carries a $\frac{3}{4}$ in. Sprocket Wheel connected by Chain to another $\frac{3}{4}$ in. Sprocket Wheel on the front roller.

A belt-operated lever is provided by

a 2 in. Slotted Strip 53, that is lock-nutted to an Angle Bracket attached to right-hand Angle Girder 1. A loose Collar, held between two fixed Collars on Rod 52, is fixed to Strip 53 by a ½ in. Bolt. Movement of the Strip brings the 57-teeth Gear on Rod 52 into mesh with ½ in. Pinion 51.

Four ½ in. Bolts with Nuts are secured one in each end hole of the 18½ in. Angle Girders 46. Two 1½ in. Strips 54 are held by the front Bolts to fill in the bottom of the wagon. These Bolts will later hold the wagon body in place. The petrol tank, which should be mounted horizontally, is obtained from a 2½ in. Cylinder and two eight-hole Wheel Discs, connected by a Screwed Rod and bolted to the Angle Girder. Nylon ribbon, 1½ in. wide is used for the belt, the ends being sewn together.

Differential

A 1½ in. Rod 34 is placed in the centre transverse bore of a Coupling and fastened by two ¾ in. Bolts carrying ¾ in. Pinions 35 which engage with ¾ in. Contrate Wheels secured on two 4½ in. Rods 36 and 37. Both these Rods pivot in the longitudinal bore of the Coupling. A 1½ in. Contrate Wheel 38 free on Rod 37 is fastened by two ⅜ in. Bolts to two Collars mounted, one each end, on Rod 34. Also on Rod 37 is fixed a Collar, placed ⅛ in. away from the Contrate 38. Washers are placed on Rod 36 against the boss of the ¾ in. Contrate Wheel and a Boiler End is added. Another Boiler End is placed on the Rod 37, then the two are joined by four 2 in. Strips, to one of which a Double Bent Strip is bolted. The last is spaced from the Boiler Ends by two Washers on each Bolt. A $\frac{7}{16}$ in. Pinion 39 on a 2 in. Rod engages with the Contrate Wheel 38. The completed differential is now connected to the gearbox by two Universal Couplings and a 2½ in. Rod.

Each rear spring is built up from a 5½ in. and a 4½ in. Strip, bolted to a Double Bracket and it is fixed to the chassis by 1 in. by ½ in. Angle Brackets. The mudguards are compound 7½ in. by 1½ in. Flexible Plates, obtained from a 5½ in. by 1½ in. and a 2½ in. by 1½ in. Flexible Plate, secured in position by Angle Brackets.

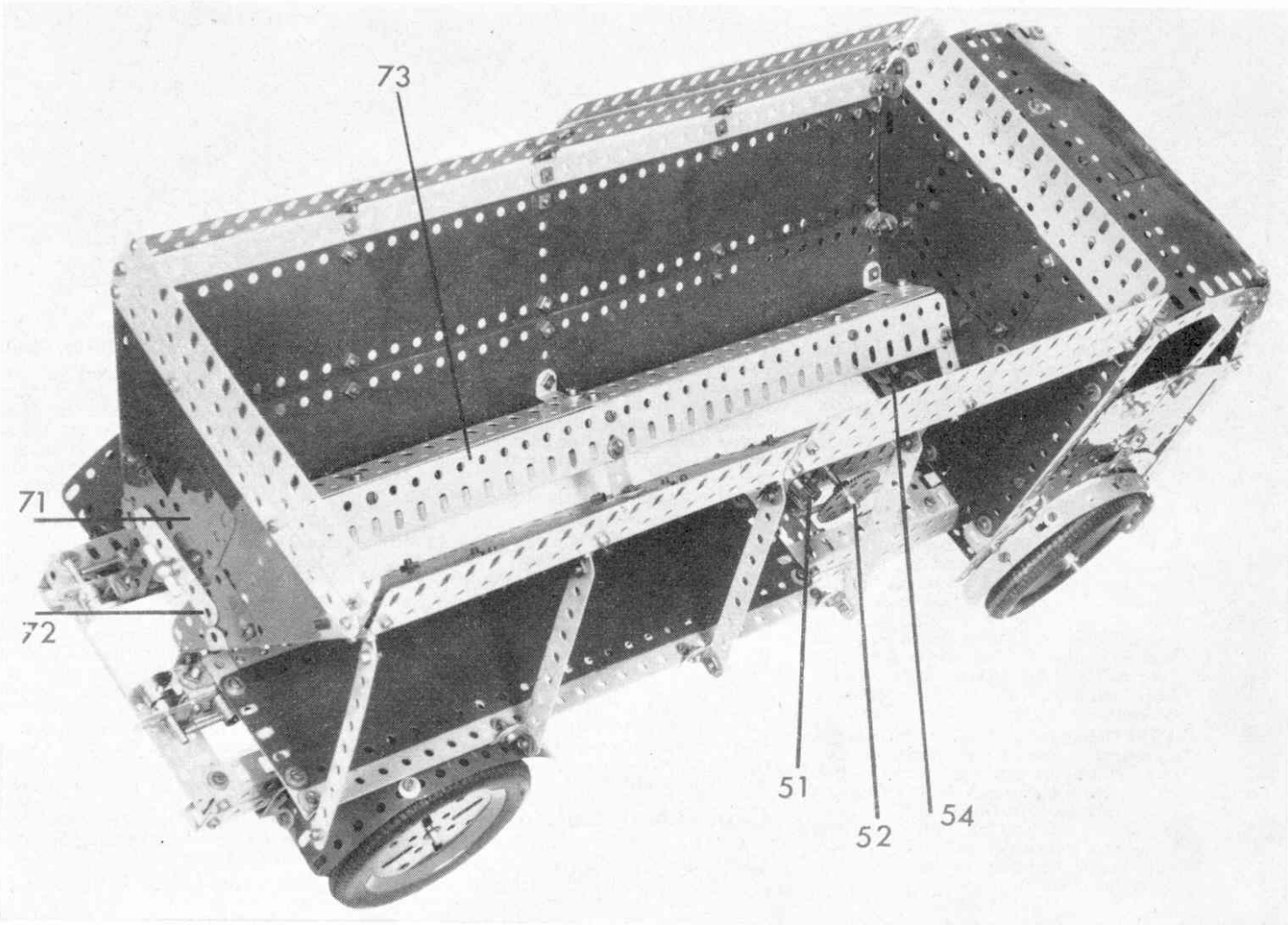
Cab

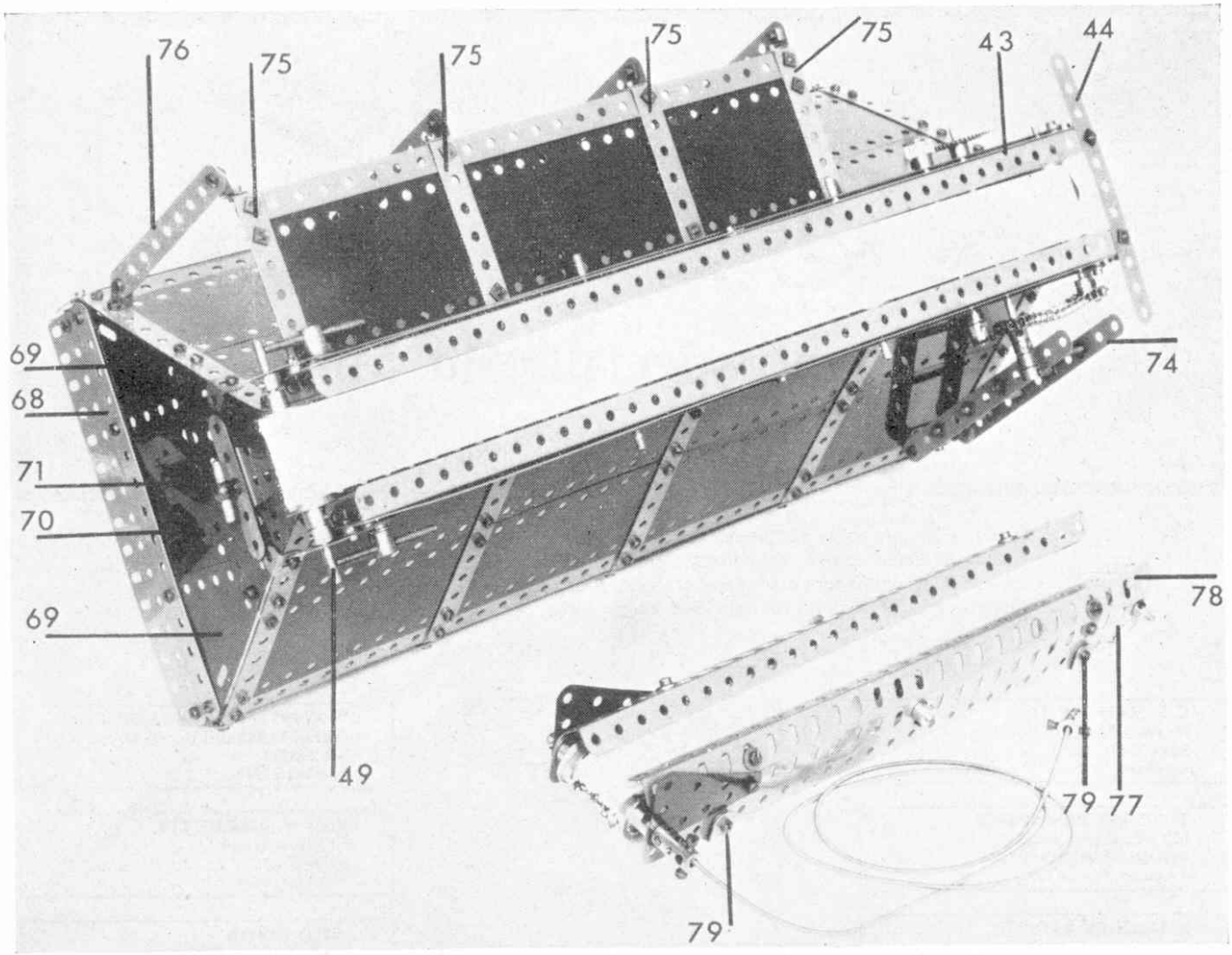
To build the front of the cab, two 5½ in. by 2½ in. Flexible Plates 55, connected at the top by a 2½ in. by 1½ in. Flexible Plate, are bolted to a 7½ in. Angle Girder 54, the outer Bolts also holding Angle Brackets in place. Two 1 in. loose Pulleys are attached, one each, to two Flexible Plates, which are then bolted in front of the Flexible Plates 55. The radiator is formed from two sets of four 4½ in. Strips, joined, at the top, by a 2½ in. Strip and three 2½ in. Stepped Curved Strips, and, at the bottom, by a 2½ in. Strip. A 4½ in. by 2½ in. Flexible Plate completes it.

The windscreen surrounds are formed, as shown, from a compound 6½ in. Strip, made up from two 3½ in. Strips, a 7½ in., two 3½ in. and a 3 in. Strip. Bolt 56, incidentally, fixes a 4½ in. by ½ in. Double Angle Strip inside the cab, against which the gear-change lever slides.

At the back of the cab are two 7½ in. Angle Girders 57 joined by a 7½ in. Strip at the top and by a 7½ in. Angle Girder 66 in the second holes from the bottom. The resulting space is filled in by one 2½ in. by 2½ in. and two 5½ in. by 2½ in. Flexible Plates. Inside, a 7½ in. Angle Girder is bolted through the fifth holes from the lower ends of Girders 57 and, to this, is fixed a compound 7½ in. by 1½ in. Flexible Plate to represent the seat. Bolts 58 secure a 3½ in. Strip on the inside to help support the radiator.

To the front of the cab is attached a 5½ in. Strip 59, a 3½ in. Strip 60, a 2½ in. Strip, and a 2½ in. Curved Strip 61. Three 2½ in. Curved Strips 62 are joined together and bolted to the Angle Girder 57 then a 6 in. Compound Strip 63 is bolted to the Curved Strips 62, the 2½ in. Strip and a 4 in. Curved Strip 64, this last also fixed to Angle Girder 57 and the 3½ in. Strip 60. The side is filled in with a 2½ in. by 2½ in. and a 2½ in. by





2 in. Triangular Flexible Plate.

A door is built up from a 2½ in. by 2½ in. and a 2½ in. by 1½ in. Triangular Flexible Plate, strengthened by a 2½ in. Strip. It is attached by Hinges to the 6 in. Compound Strip 63. A Fishplate is fastened between two nuts on a Handrail Support, carrying a 1 in. Rod in its bore to serve as a door handle. The mudguards are obtained from four Formed Slotted Strips, joined together, and attached by Angle Brackets. Finally, the roof is built using two 4½ in. by 2½ in., one 5½ in. by 1½ in., and one 2½ in. by 1½ in. Flexible Plates. It is attached by Obtuse Angle Brackets at the front and Angle Brackets at the rear.

The completed cab is placed on the chassis by inserting the Angle Girders 54 between the slot of the 24½ in. Angle Girders, and with the ⅜ in. Bolts 65 securing it to the 5½ in. Angle Girder 3. The Angle Girder 66 is now bolted to Angle Girders 1.

Wagon body

Five Obtuse Angle Brackets are bolted to each of two 18½ in. Angle Girders 57 and to these is fastened five 5½ in. Strips and two 9½ in. by 2½ in. Strip Plates. Two 9½ in. Strips and five Obtuse Angle Brackets are secured to the ends of the 5½ in. Strips, the latter supporting three 9½ in. Flat Girders. The two sides are joined together at the top by a 7½ in. Strip 68 with the help of Angle Brackets. Two 3½ in. by 2½ in. Triangular Flexible Plates 69 and a 3½ in. by 2½ in. Flexible Plate 70 are bolted to this Strip.

The front is completed by two 2½ in. by 1½ in. Triangular Flexible Plates and a 5½ in. by 1½ in. Flexible Plate, the latter being bolted, with a 1½ in. Strip at the bottom, to Angle Brackets attached to Angle Girders 67. The Triangular Flexible Plates are fastened to the 5½ in. Strips by Angle Brackets. The back is similarly built except for the 5½ in. by 1½ in. Flexible Plate and 1½ in. Strip, which are not included.

A sliding door to allow the coal to pass from the endless belt is built from a 2½ in. by 1½ in. Flexible Plate 71 with a 2½ in. Strip 72 on the outside and a vertical 3 in. Strip fixed to a horizontal 1½ in. Angle Girder on the inside, all bolted together by a Handrail Support carrying a 1 in. Rod in its bore. Another 1½ in. Angle Girder is bolted to the first 1½ in. Angle Girder to make a reversed Angle Girder, which touches the endless belt.

Four 9½ in. Flat Girders 73 are bolted to a 12½ in. Angle Girder then the whole arrangement is fixed to the side by 1 in. by ½ in. Angle Brackets, as shown. A ladder, made from 5½ in. Strips and 2 in. Screwed Rods 74, is attached to the side by a 1½ in. by ½ in. Double Angle Strip. Four 3½ in. by ½ in. Double Angle Strips 75, fixed to Angle Girder 67, are supported by 4½ in. Strips 76 attached by Angle Brackets. A 12½ in. by 2½ in. Strip Plate and a 12½ in. Strip are then bolted to the Double Angle Strips, as shown.

Conveyor belt extension

A 12½ in. Flat Girder 77 is attached to each of two 12½ in. Angle Girders 78 by Obtuse Angle Brackets.

Two 2½ in. by ½ in. Double Angle Strips 79 join the two sides together, after which two 2½ in. by 1½ in. Triangular Flexible Plates are secured at one end.

Three rollers built as before are placed in position on 3 in. Rods held by Collars. An imitation flexible drive, obtained from Spring Cord and Couplings, is connected to the first roller. Nylon ribbon again represents the endless belt.

The wagon body is now placed on the Angle Girders 46, with the earlier-mentioned ½ in. Bolts passing through the Angle Girder 67. Another Nut is placed on each Bolt and screwed down.

To try out the model, place small objects like Nuts and Bolts inside the wagon, lift the Sliding Door 71, and pull over the Lever 53. The Nuts and Bolts will be unloaded very quickly like a jet of water coming from a hose.