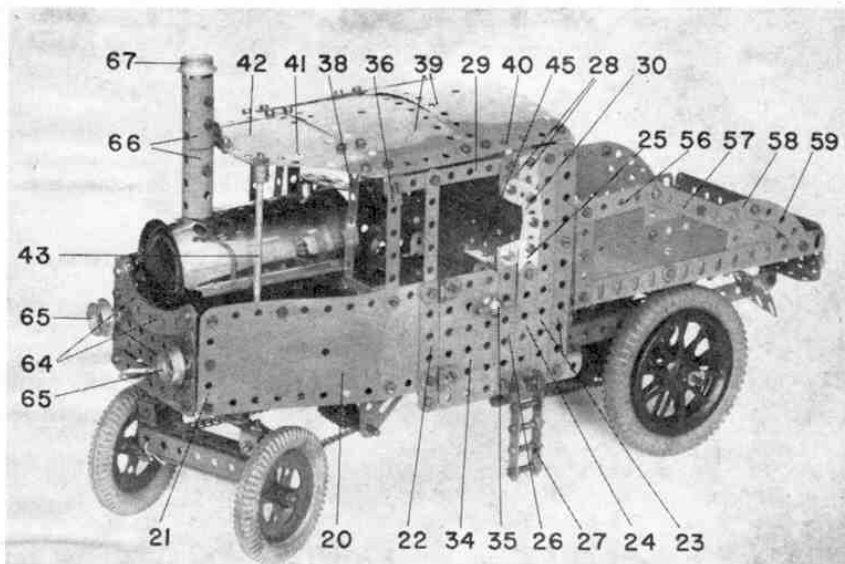


LIVE STEAM WAGON

described by
Spanner



All the sounds, smells and thrills of live steam are re-created with this working model of a 1929 Foden Steam Wagon . . .

NEVER IN MY CAREER WITH MECCANO MAGAZINE have I hidden my distinct liking for steam-powered traction. The clankings and hissings of steam locomotives and traction engines; the dense clouds of dark smoke and white water vapour; the sweet smell of hot oil; the grimy, but somehow friendly appearance of the crew as they bustle about tending to their various tasks—all these are things I have loved, but which have now virtually passed into history. No longer can the heart thrill to the sight of a mighty steam locomotive streaking through the countryside with a long streamer of smoke trailing out behind; gone are the days when the approach of the travelling fair was heralded by the sight and sound of the Showman's Traction Engine; no more can be heard the rumblings and chuffings of the old steam wagon as it carried its load down the highways and byways of the land. The world has advanced to better things—or so the experts tell us, even if there are many people who would disagree with them.

Whether or not the modern forms of motive power are improvements on steam traction, the fact still remains that there are vast numbers of normal, everyday people who regard the passing of steam power with a great deal of sorrow, but there is nothing they can do about it. We in the Meccano hobby, however, are fortunate in that, although we cannot, ourselves, do anything about the passing of steam, we can at least capture a little of its romance, not only by reproducing the old equipment in model form, but also by actually driving the models with a miniature, yet none-the-less real live-steam power unit, the Meccano Steam Engine. As everybody familiar with Meccano products knows, this is a genuine steam engine in which water is heated by a methylated spirits burner to produce steam, this steam driving a piston which, in turn, drives a crankshaft.

We have featured at least two steam-powered models in the M.M. in the last couple of years and both these were very well received. Now we present a third example which steam addicts will recognise as being based on a Foden Steam Wagon of 1929 vintage, and I have no doubt that it will be equally well-received. The original model worked extremely successfully and proved to be remarkably powerful for its size and weight. In fact, I do not hesitate to class it among the most powerful steam-driven Meccano models I have ever tried out.

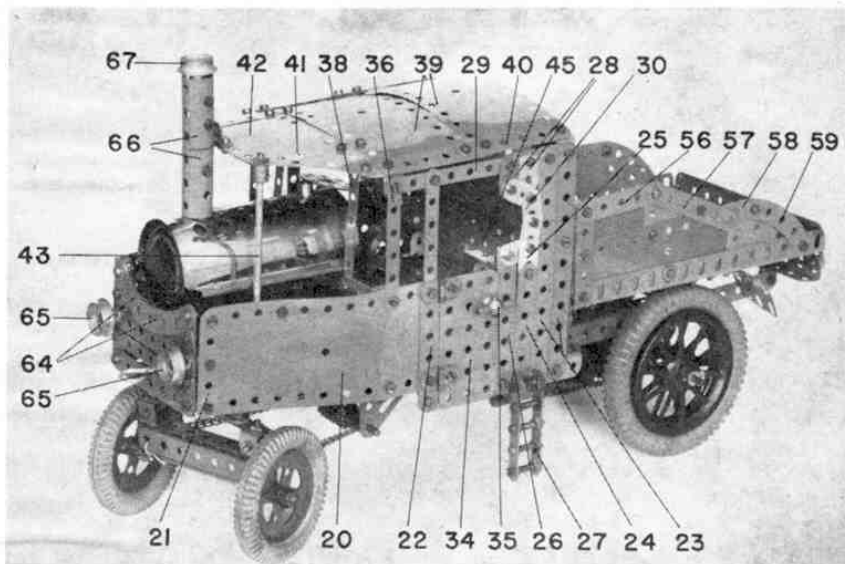
Engine and Chassis

As has been mentioned on past occasions, one of the great advantages of a Meccano Steam Engine over other power units is the fact that its design enables it to be used, not only as a power unit, but also as a very strong structural part of any model into which it is built. In this model, for example, in addition to supplying the motive power, it also serves as part of the chassis, thus reducing the number of parts required to complete the model. Before starting work on the model itself, however, it is advisable to fit the gearing to the Engine while there is still plenty of room to work. Journalled in the Engine sideplates is a 3 in. Rod held in place by a 60-teeth Gear 1 and a $\frac{1}{2}$ in. Pinion 2, the former inside the sideplates and the latter outside the plates, on the left-hand end of the Rod. Gear 1 meshes with the $\frac{1}{16}$ in. Pinion on the Engine crankshaft, while Pinion 2 meshes with a 57-teeth Gear fixed on the end of a $3\frac{1}{2}$ in. Rod, also journalled in the Engine sideplates. A $\frac{3}{8}$ in. Sprocket Wheel 3 is fixed on the right-hand end of this Rod.

Assembly of the model, proper, can now begin. Bolted transversely across the underside of the Steam Engine's base-plate is a $5\frac{1}{2} \times 3\frac{1}{2}$ in. Flat Plate 4, the forward row of holes in the Plate coinciding with the

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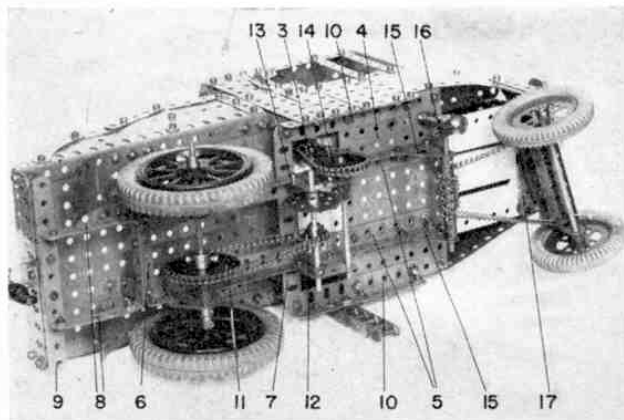
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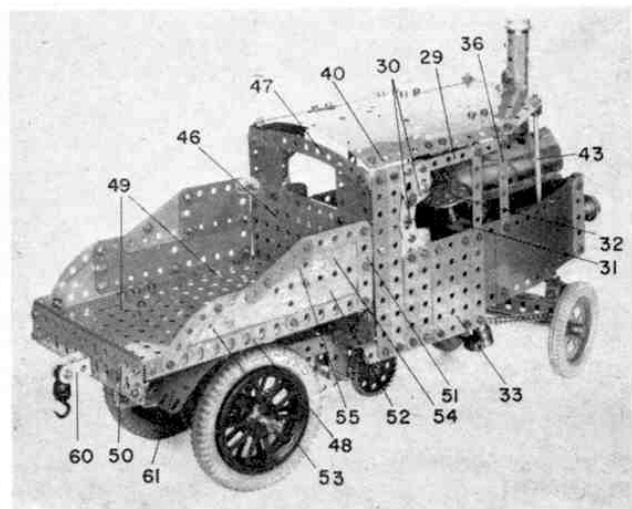


An underside view of the Steam Wagon showing the sturdy construction of the chassis and the drive system to the rear wheels.

rear corner holes in the wide section of the Engine's baseplate and the forward securing Bolts fixing two $1\frac{1}{2}$ in. Angle Girders to the top of the forward edge of the Flat Plate, one at each side. Bolted to the underside of the Flat Plate, in turn, are two $9\frac{1}{2}$ in. Angle Girders 5, separated by a distance of three clear holes and protruding rearwards a distance of ten holes beyond the end of the Engine baseplate. These Girders are connected, at the rear, by a $2\frac{1}{2}$ in. Angle Girder 6, spare flange pointing downwards, and, through their tenth holes, by a $5\frac{1}{2}$ in. Angle Girder 7, spare flange pointing upwards. Note that the bolts securing Girder 6 to Girders 5 also hold two $1 \times \frac{1}{2}$ in. Reversed Angle Brackets in place. Bolted to the spare flange of Girder 6 is a $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip, the lugs of which are extended by two $2\frac{1}{2}$ in. Strips 8, the ends of which are themselves connected by another $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip, back uppermost, to which a $5\frac{1}{2}$ in. Angle Girder 9 is fixed. The ends of Girder 7 are connected to Flat Plate 4 by two $4\frac{1}{2}$ in. Angle Girders 10.

Now bolted towards the rear ends of Girders 5, through their second and fourth holes, are two Flat Trunnions, in the apex holes of which a $6\frac{1}{2}$ in. Rod, carrying a 2 in. Sprocket Wheel 11, is held by Collars. Mounted on the ends of this Rod are the rear wheels,

Construction of the load body fitted to the model is perfectly straight-forward as this general rear view of the Steam Wagon clearly shows.



each of which consists of a 3 in. Motor Tyre trapped between two 3 in. Spoked Wheels. Sprocket Wheel 11 is connected by Chain to a $\frac{3}{4}$ in. Sprocket Wheel 12 on a $3\frac{1}{2}$ in. Rod, held by a Collar and a 60-teeth Gear Wheel 13 in the lower rear corner holes of two $1\frac{1}{2} \times 1\frac{1}{2}$ in. Flat Plates bolted to Angle Girders 5. Gear 13 meshes with a $\frac{1}{8}$ in. Pinion fixed on another $3\frac{1}{2}$ in. Rod, journalled in the lower front corner holes of the same Flat Plates. Also fixed on this Rod is a $1\frac{1}{2}$ in. Sprocket Wheel 14 which is connected by Chain to Sprocket Wheel 3 in the Steam Engine.

Two $1\frac{1}{2}$ in. Corner Brackets 15 are next bolted to the forward ends of Girders 5, the lower corner holes in these providing the bearings for a 4 in. Rod on which three Couplings are fixed to provide the steering drum. A $\frac{1}{8}$ in. Pinion 16 is mounted on the right-hand end of the Rod.

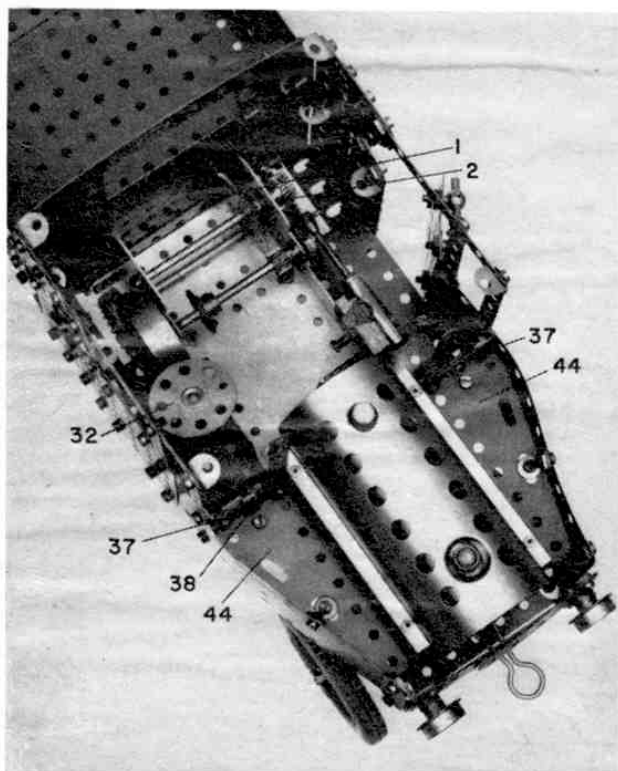
In building the front axle assembly, two $3\frac{1}{2}$ in. Strips 17, placed one on top of the other for strength, are fixed to the underside of the Engine baseplate, through its third holes from the front, the Strips being spaced from the baseplate by a Collar on the Shank of each securing $\frac{1}{2}$ in. Bolt. Lock-nutted to the centre of the Strips is a small leaf spring, built up from one $3\frac{1}{2}$ in. and two $2\frac{1}{2}$ in. Strips, curved to shape, and please note that there are two Nuts on the shank of the securing $\frac{1}{2}$ in. Bolt between the spring and the Strips to provide extra spacing. Fixed to the ends of the springs are two downward-pointing Double Brackets which are secured by $\frac{3}{4}$ in. Bolts to two further Double Brackets, bolted to a $3\frac{1}{2}$ in. "U"-section girder 18, the securing Bolts also fixing two 1×1 in. Angle Brackets 19 in position at the ends of the girder, as shown. The "U"-section girder is built up from two $3\frac{1}{2}$ in. Angle Girders. A length of Sprocket Chain is secured to one end of this girder, is passed several times around the steering drum, previously mentioned, and is then secured to the opposite end of the same girder. Journalled in the end holes in the free lugs of Angle Brackets 19 is a 5 in. Rod, serving as the front of axle. Two free-running 2 in. Pulleys, fitted with Motor Tyres, are held on the ends of the Rod by Collars.

Bonnet and Cab

At the front of the model, each side of the bonnet is similarly built. An Angle Bracket is bolted to the forward corner of the Engine baseplate, another Angle Bracket being bolted to the end of the $1\frac{1}{2}$ in. Angle Girder situated on top of the forward edge of Flat Plate 4. Bolted to these Angle Brackets is a shaped $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 20, overlayed at the front end by a $2\frac{1}{2}$ in. Strip 21 and, at the rear end, by a 3 in. Strip 22, the latter projecting one hole downward beneath the edge of the Plate to be bolted to Girder 10. Also bolted to Girder 10, in the positions shown, are two $5\frac{1}{2}$ in. Strips 23, a 3 in. Strip 24, extended by a Fishplate 25, and a $3\frac{1}{2}$ in. Strip 26. Note the Bolt securing left-hand Strip 24 also holds the cab access ladder 27 in place, this consisting of Double Bracket, to the lugs of which two $2\frac{1}{2}$ in. Narrow Strips, connected by four $\frac{3}{4}$ in. Bolts, are fixed. The upper ends of Strips 23 are connected by a 2 in. Strip, to the protruding end of which two Fishplates 28 and $3\frac{1}{2}$ in. Narrow Strip 29 are bolted, the latter projecting horizontally forward. The forward Fishplate is joined to Fishplate 25 and Strip 26 by four further Fishplates 30, arranged in a curve, as shown, to provide the cut-away shape of the cab side window.

At both sides of the model, Narrow Strip 29 is

connected to Strip 21 by a $2\frac{1}{2}$ in. Narrow Strip, the lower securing Bolt, at the right-hand side only, also holding a $2\frac{1}{2}$ in. Strip and a $1 \times \frac{1}{2}$ in. Angle Bracket 31 in place. The $2\frac{1}{2}$ in. Strip is bolted to Strip 26, while held by a Collar in the end hole in the free lug of the Angle Bracket is a 5 in. Rod, the lower end of which protrudes through a hole in Flat Plate 4. An 8-hole Bush Wheel 32 is fixed on the top end of the Rod to represent the steering wheel, whereas a Worm on the lower end of the Rod is meshed with Pinion 15 to complete the steering linkage. A $3 \times 1\frac{1}{2}$ in. Flat Plate 33 is bolted between Angle Girder 22 and the $2\frac{1}{2}$ in. Strip joining Strips 21 and 26. This Strip is omitted on the left-hand side of the model, but a $3 \times 1\frac{1}{2}$ in. Flat Plate 34 is added, being attached to Strip 21 by two Hinges to serve as the cab door. A door catch is provided by a Fishplate, held by Nuts on the shank of a Handrail Support 35 loosely attached to the Flat Plate. A 1 in. Rod is fixed in the head of the Handrail Support to serve as the handle.



In this top view of the cab, the roof and seat have been removed to show the initial reduction gearing fitted to the Meccano Steam Engine.

A 3 in. Narrow Strip 36 is now bolted between the end of each Narrow Strip 29 and Flexible Plate 20, the lower securing Bolt also fixing an Angle Bracket to the inside of the Plate. Secured to the free lug of this Bracket is a $1\frac{1}{2}$ in. Strip 37, positioned horizontally, to the inside end of which a vertical 3 in. Narrow Strip 38 is bolted. The cab roof is then built up from two curved $5\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plates 39, connected at the ends by two 5 in. compound strips 40, extended one hole forward by Fishplates. Bolted to these Fishplates are two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plates 41, joined by a $3\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 42. Each compound strip consists of two 3 in. Strips overlapped two holes. The completed roof is attached to the cab sides by Obtuse Angle Brackets, with two imitation forward stays each being provided by a 3 in. Rod 43

fixed in a Rod Socket secured in the front corner hole of Triangular Flexible Plate 41. The lower end of the Rod projects through one of the holes in a $3\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plate 44, attached by Angle Brackets to Flexible Plate 20 and Strip 37.

Inside the cab, a seat is provided by two 2 in. Strips joined by two $5\frac{1}{2}$ in. Strips and a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 45, one of the Strips being positioned under the forward edge of the Flexible Plate, the whole assembly being attached to the cab sides by Angle Brackets. The back of the cab is enclosed by a $5\frac{1}{2} \times 3\frac{1}{2}$ in. Flat Plate 46, bolted to the vertical flange of Angle Girder 7. This Flat Plate is extended three holes upwards at each end by two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plates, joined at the top by a $5\frac{1}{2}$ in. Curved Strip 47, the securing Bolts holding Angle Brackets in place, the free lugs of these Brackets being bolted to the cab sides.

Load body

Situated behind the cab is the comparatively small load body peculiar to this type of vehicle and construction, here, is perfectly straightforward. Two $7\frac{1}{2}$ in. Angle Girders 48 are connected together at each end by a $5\frac{1}{2}$ in. Angle Girder, the intervening space being enclosed by two $5\frac{1}{2} \times 3\frac{1}{2}$ in. Flat Plates 49, the rearmost Plate being bolted to the spare lugs of the Angle Brackets joining Girders 6 to Girders 5. Note that the spare flange of the rear $5\frac{1}{2}$ in. Girder points upwards, while that of the front Girder points down, the latter being bolted through the second row of holes up in Flat Plate 46. The rear Girder is connected to Angle Girder 9 by a $5\frac{1}{2}$ in. Flat Girder 50.

Each side of the load body consists of a $2\frac{1}{2}$ in. Strip 51, a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 52 and a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plate 53, all bolted to the vertical flange of Angle Girder 48. Flexible Plate 52 is extended upwards by a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 54 and another $2\frac{1}{2} \times 1\frac{1}{2}$ in. Triangular Flexible Plate 55, the complete assembly then being edged along the top by a $2\frac{1}{2}$ in. Strip 56, a 3 in. Strip 57, a $1\frac{1}{2}$ in. Strip 58 and a $2\frac{1}{2}$ in. Curved Strip 59. The upper front corner of each side is attached to the back of the cab by Angle Brackets. At the very back, a simple towing hook is provided by a Loaded Hook mounted, loose, on a $\frac{3}{4}$ in. Bolt, held by Nuts in the lugs of a $1 \times \frac{1}{2}$ in. Double Bracket 60. Equally simple are the two rear mudguards, each of which consists of a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 61, curved to shape and bolted to the underside of rear Flat Plate 49.

A "radiator-grille" for the model—hinged to allow access to the firebox of the Steam Engine—is next built up from two vertical $2\frac{1}{2}$ in. Strips connected together, in order from their lower ends, by a $3\frac{1}{2}$ in. Strip 62, a $3\frac{1}{2}$ in. Narrow Strip 63 and two further $3\frac{1}{2}$ in. Strips, two $2\frac{1}{2}$ in. Curved Strips 64 being bolted, as shown, to the top of the vertical Strips. Note that the Bolts securing right-hand Curved Strip 64 and the right-hand end of Strip 62 to the right-hand vertical Strip also hold two Hinges in position, these Hinges being bolted to right-hand Flexible Plate 20. Note, also, that $\frac{1}{2}$ in. Bolts are used to fix the centre $3\frac{1}{2}$ in. Strip in place, these Bolts also securing two $\frac{3}{4}$ in. Flanged Wheels 65 in position to serve as headlamps.

When the above assembly has been completed, it will be noticed that a small gap remains between Strip 62 and Narrow Strip 63. This gap is vital, as the handle of the Steam Engine's burner protrudes through it when the radiator-grille is "closed". The grille is kept closed, by the way, by the shank of the Bolt securing left-hand Flanged Wheel 65 engaging with

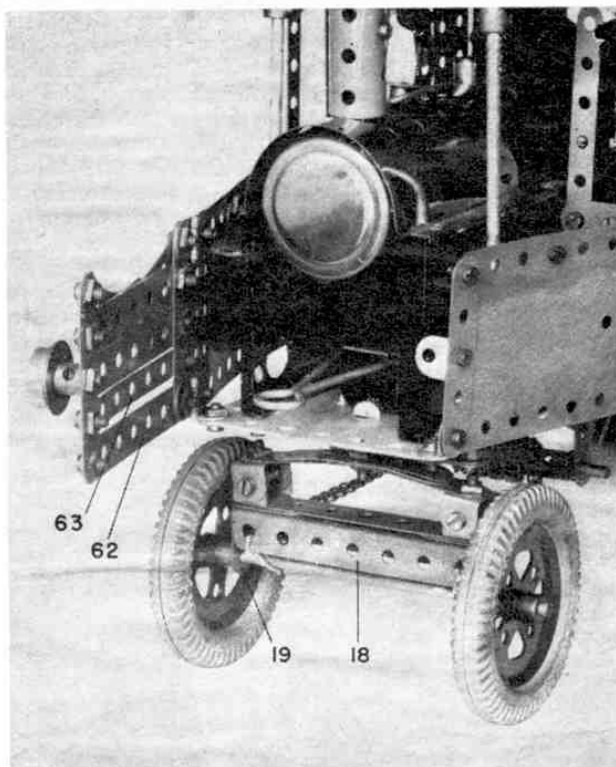
PARTS REQUIRED

6-2	1-18b	2-96a
9-3	4-19a	1-103
10-4	2-20a	7-111
12-5	3-20b	6-111a
4-6	1-24	4-114
5-6a	1-26	2-124
2-8a	2-26c	2-126a
2-8b	1-27a	2-133
4-9	2-27d	1-136
2-9a	1-32	2-142a
2-9b	218-37a	2-142b
1-9d	198-37b	2-163
2-9f	24-38	1-164
19-10	2-48a	2-179
5-11	4-52a	6-188
1-11a	1-57c	3-189
22-12	10-59	1-190a
3-12a	3-63	4-192
4-12c	2-73	6-221
1-14	2-74	2-224
2-15	1-89	3-235
1-15b	4-90	6-235a
5-16	1-94	3-235b
1-16a	1-95	1-Meccano
1-16b	1-95a	Steam
		Engine

the round hole in the spare lug of an Angle Bracket bolted to left-hand Plate 20.

Last of all a chimney is built up from two Sleeve Pieces 66 joined together by a $2\frac{1}{2}$ in. Narrow Strip bolted down the inside of the Sleeve Pieces. Fixed in the upper Sleeve Piece is a Chimney Adaptor, to which a $\frac{3}{4}$ in. Flanged Wheel 67 is secured by a $\frac{1}{2}$ in. Bolt, while held by a Nut in the lowest hole in the upper Sleeve Piece is an ordinary Bolt, shank outwards. The chimney fits over the combined filler cap safety valve of the Steam Engine, the protruding shank of the above ordinary Bolt being secured to an Angle Bracket bolted to the forward edge of the cab roof. Thus, by simply undoing the fixing Nut, the chimney can easily be removed to allow the boiler of the Steam Engine to be filled.

This completes the model, but I leave you with a



A close-up view of the front of the model with the radiator-grille hinged open to allow access to the Steam Engine burner. The cord tied to the front axle beam serves to fix the steering chain in place.

final word of warning. Because the Meccano Steam Engine is a live-steam unit, fired by a methylated spirits burner, it naturally gets extremely hot and must therefore be treated with great respect. Never touch any part of the boiler or firebox while the Engine is in use otherwise you may receive a very nasty burn. I know—I've burned myself before now!

CONTINUED FROM PAGE 133

space craft. There is, indeed, an immediate place for dirigibles in the U.S. missile programme, too.

Many components for the Saturn rocket, for instance, are now built on the West Coast of the U.S. and moved by barge down the Pacific to go through the Panama Canal.

From the further end of that artificial waterway they are carried up the Atlantic to the Gulf of Mexico, and transported up the Mississippi and Tennessee Rivers to Huntsville, Alabama, for assembly, before being barged again down the river, taken through the Gulf, and carried up the Atlantic to Cape Canaveral.

Large airships could reduce the distance—and the cost—of the journey dramatically.

Airship enthusiasts also point out that this type of transport could ferry tons of supplies quickly into areas devastated by floods, earthquakes, volcanic eruptions, and other disasters threatening thousands of lives. The death toll in such calamities is often greatly increased because medical aids and food cannot reach the scene soon enough.

Nor would a revival of airships be entirely unwelcome by the aeroplane services. The world's leading airports are no longer big enough to cope with the growing aircraft traffic, and take-off and landing has often to be delayed as a result of the congestion.

If a good slice of the air cargoes went by airships, airports would be freer to handle passenger traffic, and

much of the frustration experienced by aeroplane travellers would be avoided.

The future of the airship is considered in some quarters to be so rosy that an Association of Airship Travel was formed as long ago as 1963. Its members believe that before long the huge silver cigars will once again be in the air, fulfilling a useful role even in this jet-travel age.



The ill-fated R-101, which crashed in France whilst on a trip to India. The disaster was a deciding factor in the decline of the airship.