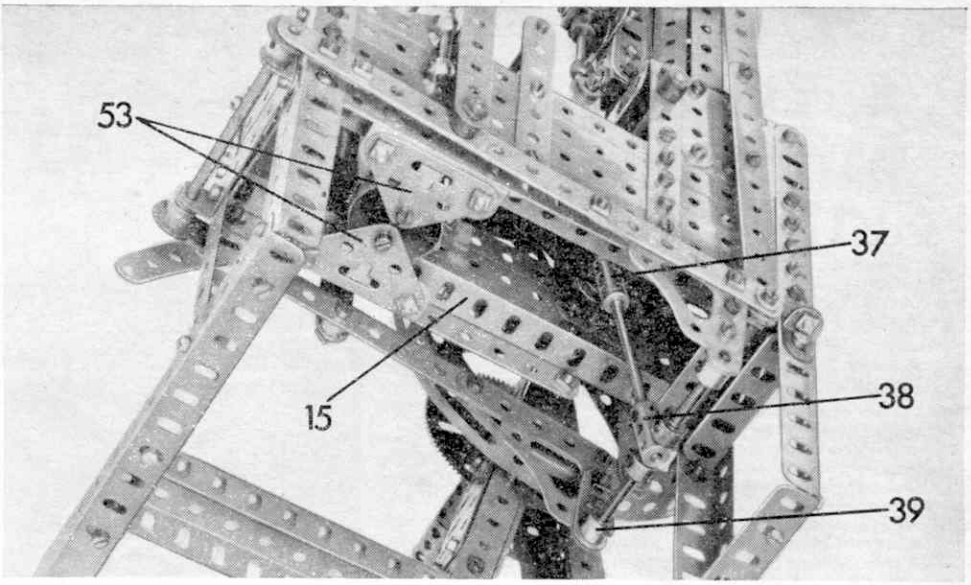
Steam for Ships

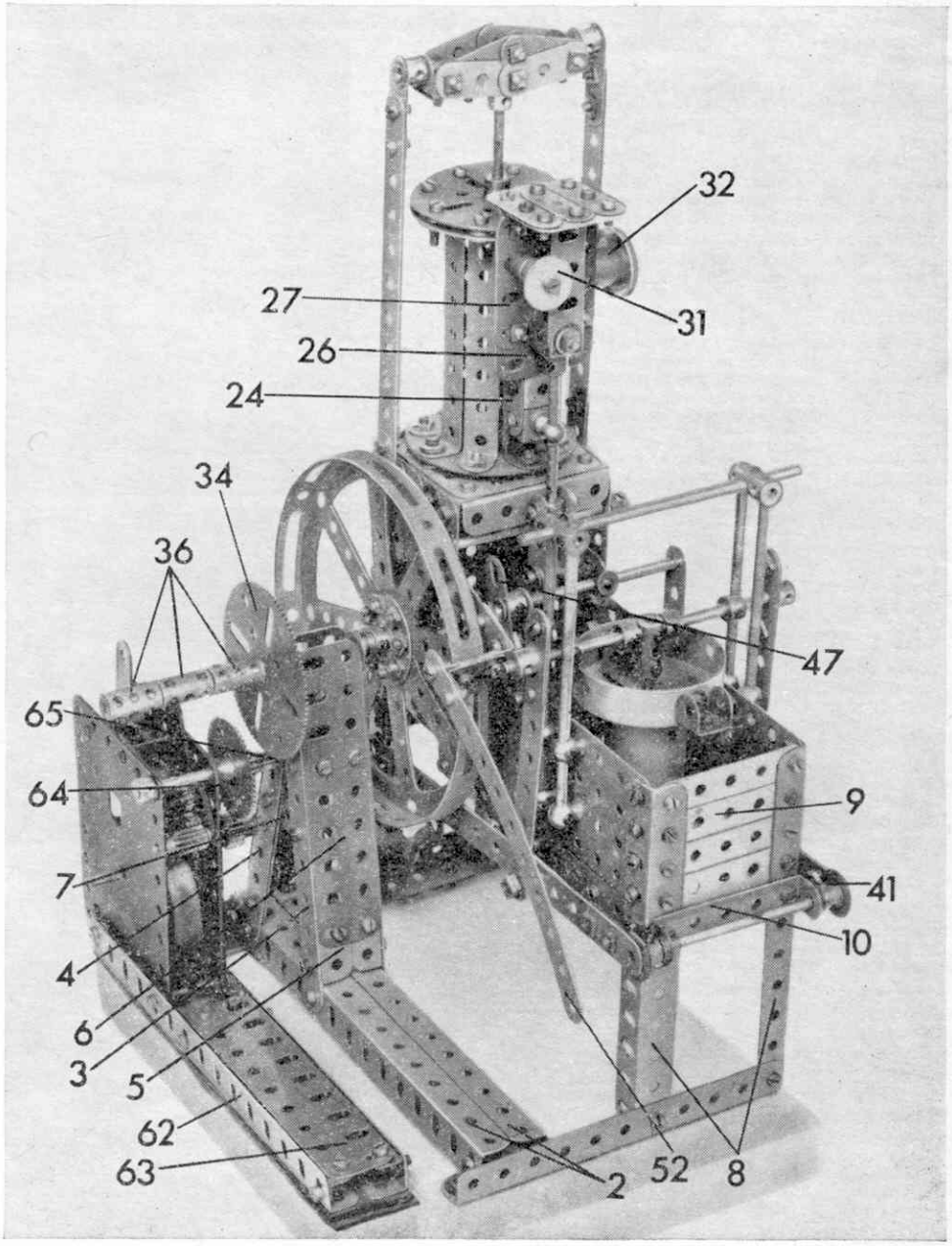
by spanner



IN 1812 Scottish inventor Henry Bell made maritime history by building the first practical steamboat to run successfully and regularly on any European river—the famous 'Comet' which plied between Glasgow and Greenock on the Clyde. This ship, tiny by modern standards with a length of only 40 feet and a beam of 10 feet 6 inches, was powered in its original form by a then-revolutionary three horse power steam engine driving four paddle-wheels, a number that was later reduced to two so as to increase speed and performance.

The engine, I hasten to add was by no means the first steam unit to be produced, but it was the first to combine simplicity and compactness with low-cost, reasonable power and comparative reliability. Perhaps the most important point of all, however, was its ability to be fitted into shallow-draft boats. M.M. reader Mr. Ian Sanders of Great Boughton, Nr. Chester, has built an almost scale model in Meccano of the engine from photographs of an original example now in the Science Museum, London. It not only looks like the original, but also reproduces all its basic movements. The accompanying illustrations show Mr. Sanders' actual model, motive power for which is supplied by a No. 1 Clockwork Motor, and you will note that it is built almost entirely from Strips and Girders. This results in greatly increased strength and rigidity, a fact which is worth bearing in mind for other models if you have sufficient parts at your disposal.

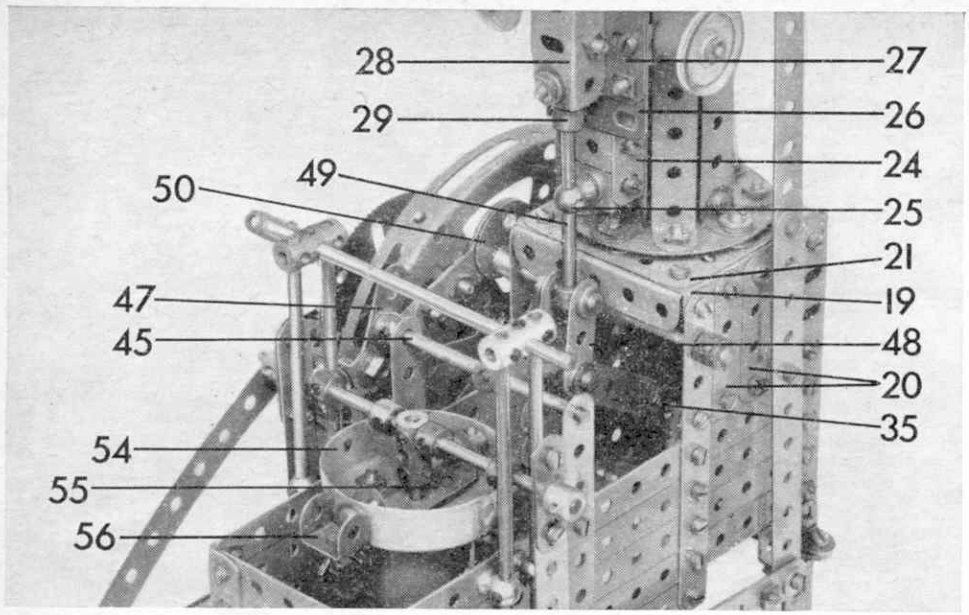
Before describing the model I should mention that Mr. Sanders has used in its construction two or three very old parts, the designs of which are slightly different to current versions of the same parts, as well as using a few Pulley bosses in place of Collars. Neither of them, however, causes any difficulty, and I mention them only to avoid puzzlement if you should spot them in the illustrations. I will point out the former parts as I come to them, but I will simply refer to the bosses as 'Collars'. The only other point to remember is that Mr. Sanders has used a wooden base rather than a built up Meccano base, therefore, I will incorporate the base in the description.

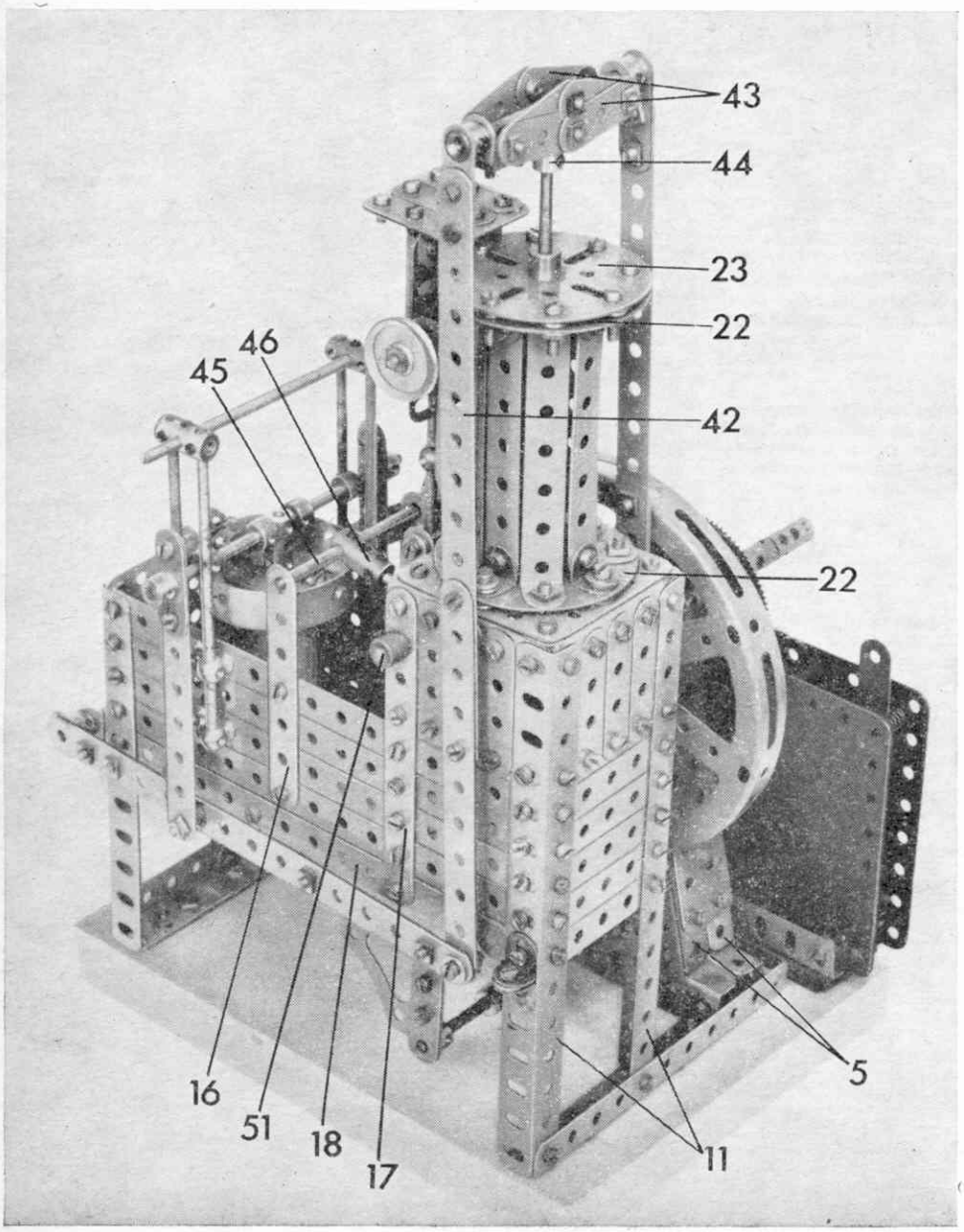


FRAMEWORK

Two 5½ in. Angle Girders 1 are connected by two 7½ in. Angle Girders 2, attached by Angle Brackets with their horizontal flanges uppermost and touching. Two 5½ in. Strips 3 and 4 are bolted to each Angle Girder 2 as shown, and a 3½ in. Angle Girder 5 is fixed to each of these Strips. Each pair of Angle Girders 5 is then joined by a 5½ in. Flat Girder 6, while a 1½ in. Strip 7 is bolted between Strips 3 and 4.

Bolted to one Angle Girder 1 are two 5½ in. Girders 8, which are connected at the top by five 2½ in. Strips 9, the bolts fixing the lowest of these Strips also holding a Double Angle Strip 10 in place. Bolted to the other Angle Girder 1 are two 7½ in. Angle Girders 11, these being joined, at the





top, by a 2½ in. Angle Girder and through their fourth holes down by a 1½ in. Strip which is connected to the 2½ in. Angle Girder by three 2 in. Strips 12. A further four 2½ in. Strips 13 and a 2½ in. Angle Girder are also bolted between Girders 11 as shown.

Girders 8 and 11 in both cases are now joined by three 7½ in. Strips 14 and one 7½ in. Angle Girder 15, all of which are joined by a 3½ in. Strip 16 and a 4½ in. Strip 17, the latter projecting one hole below Angle Girder 15. A 5½ in. Strip 18 is bolted between the lower end of this Strip and Girder 8, while a 2½ in. Angle Girder 19 is fixed between the upper end of the Strip and Angle Girder 11. Also bolted between this Strip and Girder 11 is a 2½ in. Strip, to which three 2 in. Strips 20 are fixed. Angle Girders 19 at each side are joined by another 2½ in. Angle Girder then a 2½ in. by 2½ in. Flat Plate 21 is bolted in place at the top.

FLYWHEEL AND VALVE GEAR

To complete the cylinder, two Face Plates 22 are connected by five 3½ in. by ½ in. Double Angle Strips and three similar compound Double Angle Strips obtained from 3½ in. Strips and Angle Brackets, then another Face Plate 23 is bolted to the upper Face Plate 22. The cylinder can now be fixed in place by bolting lower Face Plate 22 to Flat Plate 21. Before fitting one of the built up Double Angle Strips, the valve should be attached to the 3½ in. Strip. Two 2½ in. Angle Girders 24, arranged to form a 'U' girder are connected by four Double Brackets, to the lower of which a Handrail Support 25 is fixed and to the upper two of which two 2½ in. Flat Girders 26 are bolted. To these Flat Girders, in turn, are bolted two 2 in. Angle Girders 27 to one of which another 2 in. Angle Girder 28 is attached to enclose the resulting space. A large Fork piece 29 is fixed to Angle Girder 28.

A 1½ in. Angle Girder, to which three 1½ in. Strips 30, connected by a 1½ in. Flat Girder, are fixed, is attached to the top of the Flat Girders 26. Two ¾ in. Washers 31 and two Collars are mounted on a 1½ in. Bolt, which is then passed through left-hand Angle Girder 27 and the corresponding Flat Girder and is finally screwed into a Threaded Boss to hold the arrangement in place. A 1 in. Pulley with boss and a Chimney Adaptor 32 are then attached to right-hand Flat Girder 26 by an Angle Bracket, after which the completed valve can be bolted to the Cylinder.

The flywheel is represented by a Hub Disc 33, which is bolted to an 8-hole Bush Wheel mounted on a 6½ in. Rod journalled in the end holes of Strips 3 and 4 and corresponding Strip 14, being held in place by a Collar inside Strip 14 and a 2½ in. Gear Wheel 34 outside Strips 3 and 4. Note that the Bush Wheel is spaced from inside Strips 3 and 4 by four Washers. The Rod, incidentally, should project about half an inch through the inside holding Collar to allow a Double Arm Crank to be fixed on its end. This Double Arm Crank is extended a distance of one hole by a 2 in. Strip 35, bolted to the arms of the Crank, but, first of all, three Couplings 36 are added to the other end of the flywheel Rod. Two of the Couplings illustrated, by the way, are examples of the old parts mentioned earlier.

A ¾ in. Bolt is now passed through one end transverse smooth bore of a Coupling 37, two Washers are placed on its shank and it is then clamped by two Nuts to 2 in. Strip 35. The Coupling, which must be free to move, carries a 3 in. Rod in its longitudinal bore, on the other end of which another Coupling 38 is fixed. Held by Collars in the end transverse smooth bore of this Coupling is a 3½ in. Rod on the ends of which two Cranks 39 are mounted. Bolted to each Crank is a Corner Gusset that, in turn, is fixed to a 7½ in. Strip 40, to one end of which a Crank 41 is bolted. This Crank is another example of an old part in the original model and is mounted on a 3½ in. Rod journalled in the lugs of Double Angle Strip 10, two Washers being used as spacers.

At its other end, Strip 40 is lock-nutted to a 10½ in. compound Strip 42, obtained from a 7½ in. and a 5½ in. Strip, to the top of which another Crank is fixed. This Crank is mounted on a 3 in. Rod, carry-

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HINT FOR YOUNGSTERS

Lastly, this month, I should like to pass on a useful hint to young builders or newcomers to the Meccano hobby, which has been sent in by Mr. R. Lowe of Gorton, Manchester 18. Mr. Lowe writes, 'sometimes when building a model a Collar or Gear Wheel is required on a shaft which is very awkward to get at. I thought of a simple way to overcome this (problem) by using a Screwed Rod as shown in the diagram'. (See diagram 6.)

This solution of Mr. Lowe's is easy and effective. All you do is screw the Screwed Rod 1 into one transverse tapped bore of the Collar or Gear and, using the Rod as a handle, slide the part 2 onto the shaft in question 3. The Screwed Rod can then be removed or, if required, can be used to hold the part steady while the Grub Screw is tightened.

IDEAS STILL WANTED

Finally, I should like to remind readers that I am still only too pleased to receive any material for publication in these pages. Nothing is too insignificant for consideration so, if you have designed anything, no matter how small and simple, don't hesitate to send details to me, addressed to Meccano Magazine, Binns Road, Liverpool 13. After all, as I have said before, we can't feature an 'Among the Model-Builders' article every month without hearing from you, the model-builders!

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ing a 2½ in. by ½ in. Double Angle Strip to which two Double Brackets are bolted. Fixed on to the lugs of these Double Brackets are eight 1½ in. Strips 43, arranged as shown in two groups of four to represent the crosshead. A Double Arm Crank 44 is added to the underside of the Double Angle Strip and a 4½ in. Rod, free to slide in the bosses of upper Face Plate 22 and Face Plate 23, is secured in its boss.

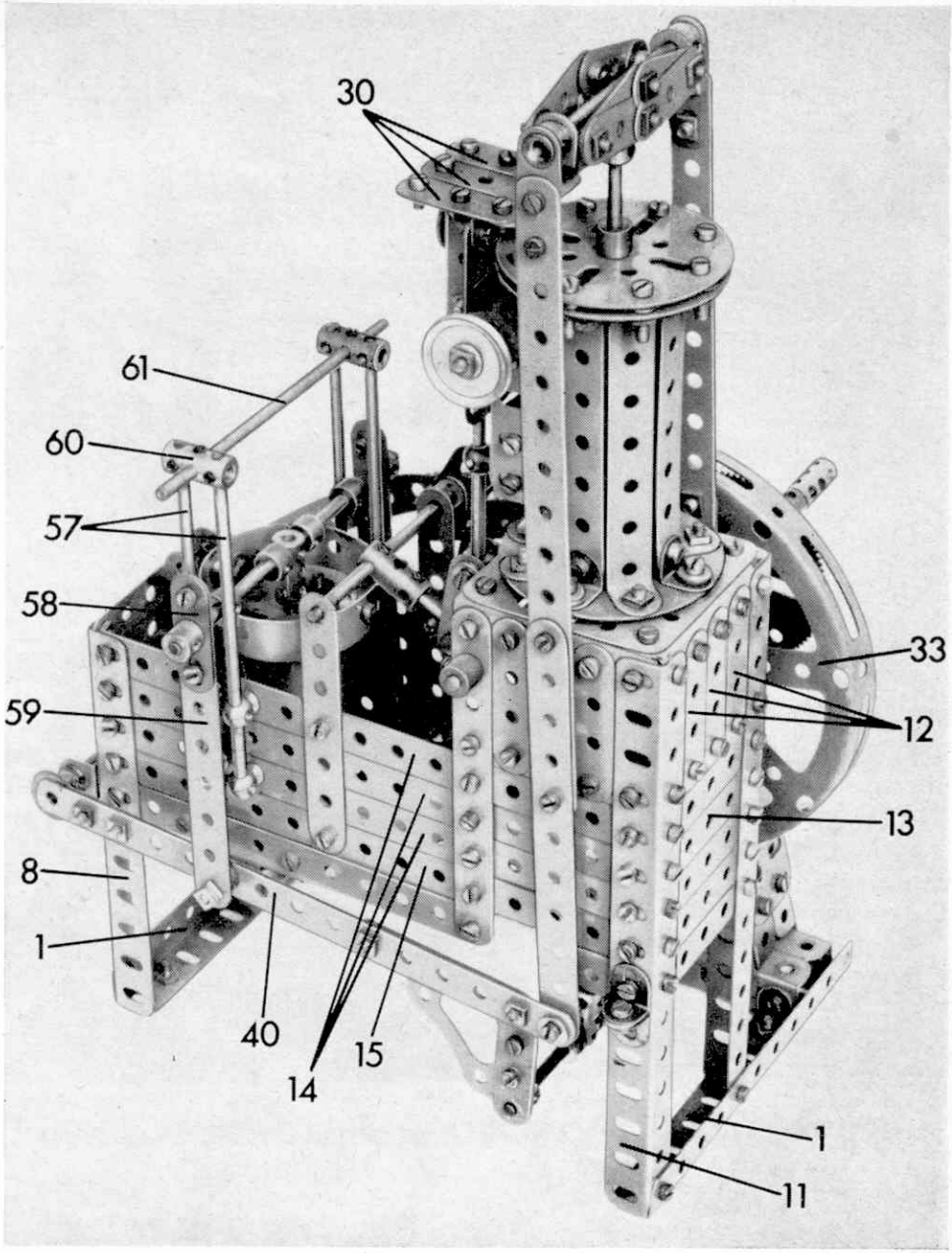
Journalled in Strips 16 is a 3 in. Rod 45 with a Coupling 46 in its centre and a Double Arm Crank 47 on one end. Fixed in the longitudinal bore of the Coupling is a 1 in. Rod, on the end of which a Collar is held by two Bolts screwed into its tapped bores. Each of these Bolts carries on its shank two Washers and a 1½ in. Strip 48 which must be free on the Bolt. At their upper ends, Strips 48 are joined by another Bolts/Washers/Collar arrangement, the Collar carrying a 3½ in. Rod 49, that slides in Handrail Support 25 and the boss of Large Fork Piece 29.

Lock-nutted to Double Arm Crank 47 is a 1 in. by 1 in. Angle Bracket, one lug of which is extended by a 2 in. Strip and a Single Throw Eccentric 50, the latter mounted on the end of a 3½ in. Rod 51 journalled in Strips 17 and held by a Collar. Bolted to the other lug of the Angle Bracket are two 1 in. by ½ in. Angle Brackets, to which a 5½ in. Curved Strip 52 is fixed. This represents what, on the original full-size engine, was the reversing lever, but it does not actually reverse the model.

MOTOR MOUNTING

Two 7½ in. Angle Girders 62 are joined by a 4 in. Flat Girder 63, attached by Angle Brackets, but note that the Flat Girder is positioned at one end of the Angle Girders. Bolted between the Angle Girders at their other end is a No. 1 Clockwork Motor with a ½ in. Pinion on its output shaft. In mesh with this Pinion is a 57-teeth Gear Wheel 64, mounted on a 2 in. Rod journalled in the Motor side plates and held by a Collar. Gear 64 is another example of an old part. Fixed on the end of the Rod is a driving pinion 65 from a No. 1 Clockwork Motor.

The completed engine is now screwed to a wooden baseboard with dimensions of approximately 9 in. by 7 in., remembering to leave sufficient room for the Motor mounting to be screwed alongside it. The mounting is positioned so that the driving pinion 65 engages with Gear Wheel 34, and is raised to the correct height by several strips of rubber packed beneath Angle Girders 62. These rubber strips also serve to reduce running noise enormously. I should imagine, incidentally, that the wooden baseboard used by Mr. Sanders could be replaced by a built up Meccano base. I leave this up to you to design, however.



THE PUMP

Beneath the model, two 1½ in. Corner Brackets 53 are fixed one each to two 2 in. Angle Girders which are, in turn, fixed to Strips 18, then a Cylinder is attached to the Corner Brackets by Angle Brackets. Attached to the top of the Cylinder, also by Angle Brackets, is a Boiler End 54, across the inside of which a 1½ in. by ½ in. Double Angle Strip 55 is fixed by ½ in. Bolts, a Collar on the shank of each Bolt acting as a spacer. A Double Bracket 56 is added on the outside being attached by an Angle Bracket.

Sliding in the centre holes of Double Angle Strip 55 and the Boiler End is a 2½ in. Rod, carrying a Coupling at its end. A 5 in. Rod is loose in the upper transverse bore of this Coupling, but is prevented from sliding about by two Collars. The ends of the Rod are each located between two 4½ in. Rods 57, mounted in Handrail Supports bolted to Strips 14, then Double Arm Cranks 58, extended by 4½ in. Strips 59, are fixed in position, as shown. The lower ends of Strips 49 are lock-nutted, with ½ in. Bolts, to Strip 40, a Collar on the shank of each Bolt separating the two Strips from each other. The upper ends of Rods 57, on the other hand, are joined by Couplings 60, which are themselves connected by a 4½ in. Rod 61.

PARTS REQUIRED:

10 of No. 1b
8 of No. 2
4 of No. 2a
5 of No. 3
12 of No. 5
11 of No. 6
15 of No. 6a
8 of No. 8b
4 of No. 9
2 of No. 9b
7 of No. 9d
3 of No. 9e
1 of No. 9f
7 of No. 11
23 of No. 12
1 of No. 12a
2 of No. 12b
1 of No. 14
1 of No. 15
6 of No. 15a
4 of No. 16
1 of No. 16a
3 of No. 16b
1 of No. 17
1 of No. 18a
1 of No. 22
1 of No. 26
1 of No. 27a
1 of No. 27c
258 of No. 37a
237 of No. 37b
50 of No. 38
2 of No. 38d
1 of No. 48
2 of No. 48a
5 of No. 48b
17 of No. 59
6 of No. 62
5 of No. 62b
7 of No. 63
1 of No. 64
1 of No. 89
3 of No. 103c
2 of No. 103f
2 of No. 103h
2 of No. 108
3 of No. 109
2 of No. 111
14 of No. 111a
1 of No. 111d
1 of No. 116
1 of No. 118
1 of No. 130a
2 of No. 133
9 of No. 136
1 of No. 162a
1 of No. 164
1 of No. 216
1 of No. 1 Clockwork Motor
1 of No. 1 Clockwork Motor driving pinion