

COLLECTORS' CORNER

by B.N. Love

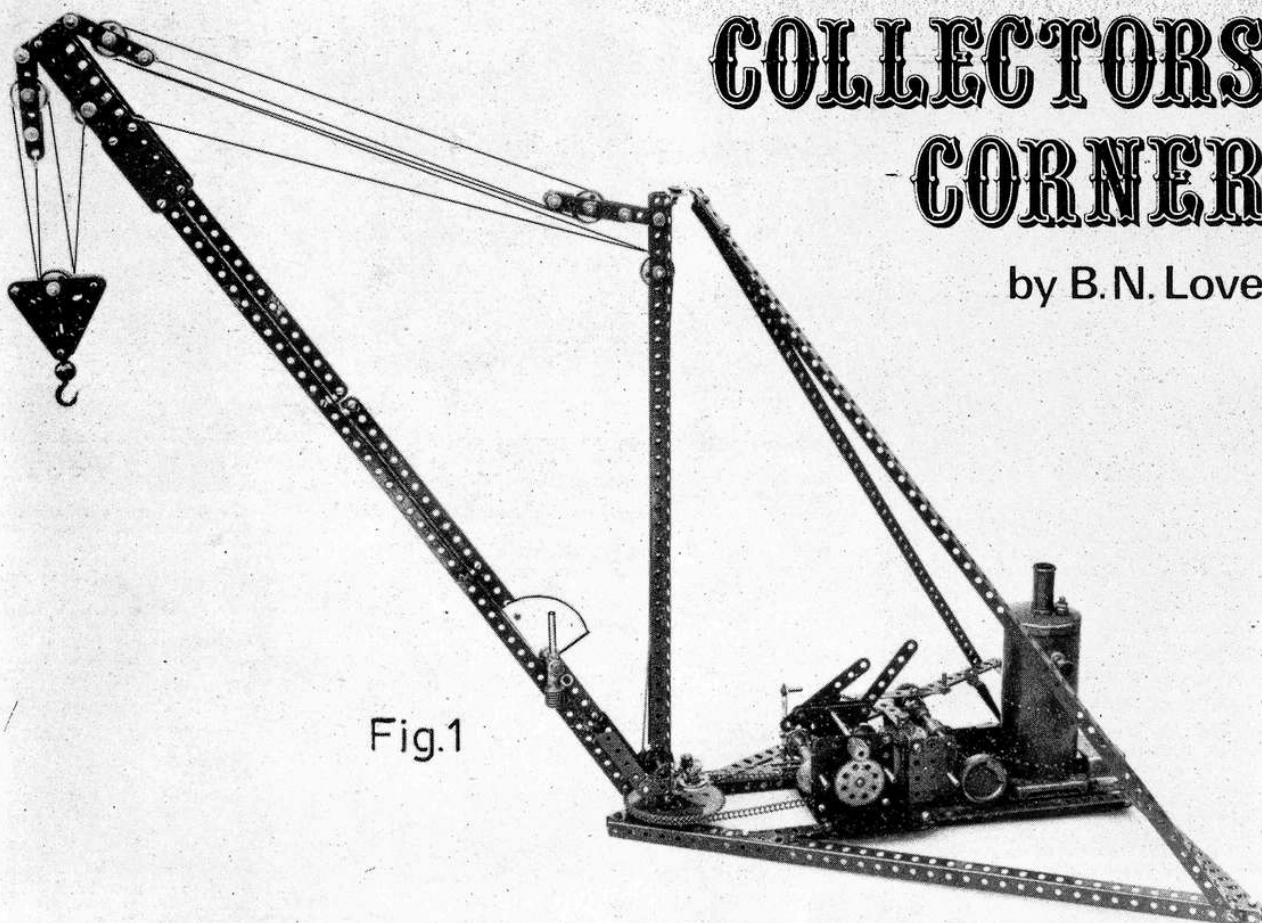


Fig.1

Super Model No. 6a

Past Masters 2

As 'Collectors' Corner' this issue gives full building details for a model which was first designed around 1930, it also qualifies as our second article in the 'Past Masters' series, begun in the July MMQ. We'll have another Past Master for you in January.

AS PROMISED in the previous edition of MMQ, full instructions for building Super Model No. 6a are presented here. The author would like to make it clear at the outset that all material in this article including text, research, illustrations and the actual model-building is his own work. It is known that an amateur broadsheet for enthusiasts did sell theoretical instructions for this model in recent years, but no photographs of an actual built-up model have ever been officially published before, apart from the one shot of the original model on page 15 of the 1930 Steam Engine Manual. This is the sole reference material used by the author.

Older readers of the M.M. who have a fond nostalgia for the early Meccano Super Model Leaflets will not be surprised to learn that SML

6a — also listed as Model No. S30 — has a number of defects in its design and a number of errors in the parts list given with the original single illustration. At the end of this article, a corrected list of parts is given so that those who wish to can make this model, which is really a very simple one. The only obsolete part listed is the Large Loaded Hook — part No. 57b — but the present-day Hook (57c) is of superior design and production in every respect (Any purists may obtain one of the old pattern from the author). Few readers will own an original Meccano Steam Engine, but the latest Binns Road model will directly replace the older engine in this model with virtually no modification to construction.

However, the simplicity of the model is a basis for some of its serious shortcomings, the principal one of

which, is the instability of the model. Its base is an equilateral triangle instead of a right-angled triangle so it is very prone to topple. By screwing the model to a substantial baseboard, this defect can be overcome. As we proceed with the building instructions, other design weaknesses will become evident. These should not deter the enthusiast who has an inkling to build the "mystery" SML 6a, but should serve to make him aware of possible disappointments.

CRANE FRAMEWORK

Beginning with the crane framework, three 18½" Angle Girders are joined up as a triangle with one Nut and Bolt at each corner, the slotted flanges of the Girders horizontal and the round hole flanges to the outside of the base. Choosing one corner of the base apex, a 2½" Strip is bolted between the base sides, five holes back from the apex, to form a simple bearing for the pivot of the crane mast. A pair of 12½" Angle Girders are placed in a parallel line inside the base triangle, slotted flanges horizontal and pointing outwards, and their front ends are bolted to the slotted flanges of the base, nine holes back from the apex. The rear ends of the Girders are bolted in place, fifteen holes in from either corner at the rear of the base — and the base is completed.

A pair of 24½" Angle Girders form the tie legs of the derrick and these are topped with 2½" Strips, bent to shape as shown in Fig. 2. **Warning:** if enthusiasts attempt to use pre-war parts at this point, they should bear in mind that 1930 stock tends to be rather thicker, but more brittle than current Strips. The author lost three of these original 2½" Strips in the process of bending them, despite years of experience. Moral — use post-war Strips if you

are going to bend them! Before attaching the tie legs, make up the crane mast.

CRANE MAST

Bolted by their round holes to the top and bottom of the pair of 18½" Angle Girders forming the mast are 1½" Angle Girders, as shown in Fig. 1. In addition, at the bottom, the Bolts holding the 1½" Girder, are passed through the mast and into the bottom hole of the Trunnions shown, but a little slack is left on the Nuts at this stage. The Trunnions are now splayed open and a 1½" Rod is entered through the third hole up of the mast, two 1" loose Pulleys, separated by a Washer, being placed on the Rod before it is finally pushed through the other side of the mast. "Padding" Washers may be added to keep the two Pulleys aligned for control and free running. The two Trunnions are now pushed back to the vertical where they will trap the 1½" Rod in place. The securing of these Trunnions is completed by placing 1" x 1" Angle Brackets one hole up from the foot of the mast behind the Trunnions where they form supports for the horizontal guide Pulleys at the rear of the mast, see Fig. 4. A Threaded Pin is fixed in each Bracket to form vertical fixed spindles for the guide Pulleys. The mast is bolted through the slotted flange of the lower 1½" Girder to the face of the 3" Sprocket Wheel, boss downwards, the Girder being centralised over the boss. The Sprocket Wheel is fitted with a 1" Rod.

DERRICK JIB

This is a compound structure having a pair of 24½" Angle Girders below, bolted together by their round holes. A pair of 9½" Angle Girders, similarly joined, are bolted to the 24½" Girders at the upper end and the remaining space below is occupied

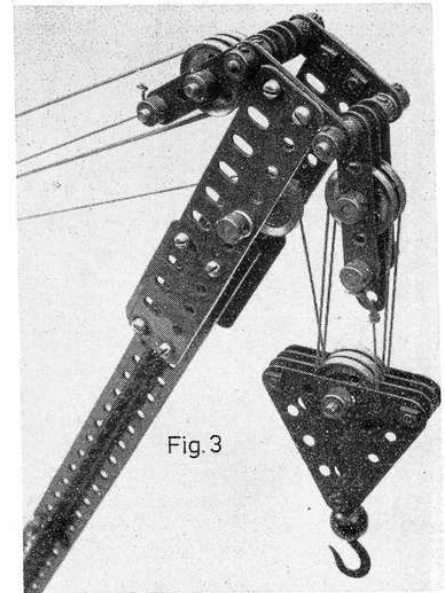


Fig. 3
Close-up of jib head. Note double thickness of Flat Girders and 2" Strips to give a rigid structure.

by a pair of 12½" Girders and finally a pair of 2½" Girders. These last Girders, however, are fitted with their round hole flanges outwards and are set at a width to enter between the Trunnions at the foot of the mast with just a little clearance. Later, the jib will pivot at this point on a 2" Axle Rod trapped in place by internal Collars. To give these clearance, the two 2½" Angle Girders at the base of the jib are bolted in place at their lower ends one hole up from their tips. The jib head is reinforced by using double layers of 5½" Flat Girders fixed by four 2½" Angle Girders at the lower end to the top of the compound jib girder, one set of 2½" Girders above and one set below. Again, double 2" Strips provide strong journals for the jib head blocks and these are bolted to the extreme ends of the 5½" Flat Girders as shown in Fig. 3.

STEAM ENGINE MOUNTING AND PRIMARY GEARING

Counting six holes back from the front ends of the parallel 12½" Girders in the base, a 5½" x 3½" Flat Plate is bolted in place as shown in Fig. 4. As the 1930 Steam Engine has an off-set base, the near side in Fig. 4. is bolted 17 holes in from the left rear while the far side is bolted 16 holes in. This still means that the forward end of the Steam Engine base plate will rest centrally on the rear row of holes of the Flat Plate.

The chain drive for the mast slewing and the first stage of gearing is quite evident from the original

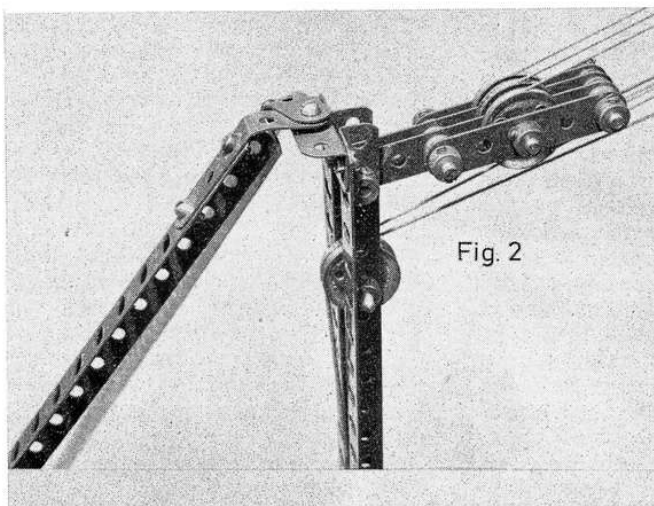
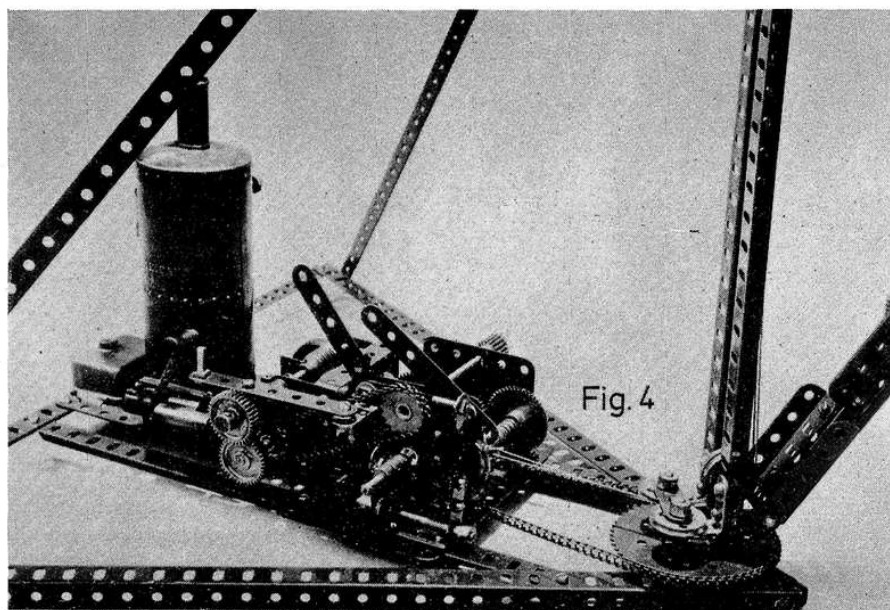


Fig. 2

Opposite page, a general view of the "mystery" Super Model No. 6a — Steam-driven Stiff Leg Derrick, circa 1930. The jib radius indicator is a Standard Mechanism. Left, a close-up of the mast head pivot and luffing block.



The 'mystery' side of the Steam Derrick revealed! This shows the logical disposition and construction of the gear-shift levers.

illustration in the 1930 Steam Engine Manual and is as follows: The Counter shaft of the engine is replaced with a $4\frac{1}{2}$ " Rod which protrudes $\frac{1}{2}$ " through the near side of the engine plating. It is, of course, fitted internally with the special fine-tooth reduction gear of the old Steam Engine and then a Collar for internal lateral alignment towards the far side plate. On the outside, a $\frac{3}{4}$ " Sprocket Wheel is fixed to the shaft and then, about 1" further out, a 1" Gear Wheel is attached. The shaft above this one is 5" long and carries a Worm and spacing Collar between the engine plates, as shown in Fig. 4, while outside it carries the slotted or female portion of a Dog Clutch. Taking care to get free running alignment, a Socket Coupling (vital to the original model, but completely unmentioned in the 1930 parts list) is fitted with a 1" Gear Wheel, from which the Grub Screw has been removed, and the second half of the Dog Clutch, similarly treated. Each end of the Socket Coupling has a pair of Grub Screws and these should be carefully tightened on the Gear and Dog Clutch portion to ensure axial alignment throughout. The sub-assembly resulting must spin freely with no binding on the shaft. An external Collar fixed to the last-mentioned shaft holds the Socket Coupling assembly on the shaft with clearance from the other section of the Dog Clutch.

Bearings for a 3" vertical Rod carrying the slew drive are formed by a $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip bolted across the top of the Steam

Engine plating, as shown, and the junction of the base plate and the $5\frac{1}{2}$ " x $3\frac{1}{2}$ " Flat Plate. Where these latter two meet, the matching central hole should be drifted clean to ensure a free-running bearing for the lower end of the slewing shaft. Washers should be fitted at all stages on shaft components subject to rubbing friction. The 3" slewing shaft is passed down through the Double Angle Strip and through a 57t Gear Wheel fixed on the shaft to mesh with the Worm. The other $\frac{3}{4}$ " Sprocket Wheel is mounted on the shaft, boss downwards, and the shaft is passed through the plating below. The top and bottom end of the shaft are held by Collars, fitting Washers in the process.

At this stage the $24\frac{1}{2}$ " tie legs of the derrick may be bolted one hole in from the rear of the base, leaving them loosely bolted, slotted flanges outwards and angled to the top/rear. They are laid flat while the mast is stepped. The 1" Rod held by the 3" Sprocket Wheel is placed into the centre of the $2\frac{1}{2}$ " Strip at the front of the base where it is secured with a Collar from below. The tie legs are raised up and their ends lapped over, then they are joined centrally to the upper $1\frac{1}{2}$ " Angle Girder by a $3/8$ " Bolt and lock-nuts. The mast should be checked to see that it is free to turn without binding and that it is standing upright. If it is not, the tie legs or lower bearing Strip should be checked for correct placings. About 20" of Sprocket chain are now run between the slewing shaft lower Sprocket Wheel and the 3" Sprocket

at the foot of the mast. A preliminary steaming may be made at this stage to check the Dog Clutch gear and slew drive.

AUXILIARY GEAR BOX AND CONTROL LEVERS

We now come to a second weakness in design, i.e. the braking system which is built on to the far side plate of the gearbox. Two $\frac{1}{2}$ " Bolts are fitted into either end of a $2\frac{1}{2}$ " Strip where they are tightly secured with Nuts. A Washer is slipped on each Bolt and then a $3\frac{1}{2}$ " Strip over each Bolt shank, one hole in from its end. Three more Washers are placed on the Bolts and then another Nut done up just a little more than finger tight. The Bolts are passed through the top row end holes of a $2\frac{1}{2}$ " x $2\frac{1}{2}$ " Flat Plate and are secured tightly with a Nut on each shank. The last two Nuts on each Bolt shank are adjusted to ensure that the two $3\frac{1}{2}$ " Strips offer considerable resistance to being moved. This is to ensure that they will stay in the "On" or "Off" position — not a very sound mechanical design! The bottom hole of each brake lever thus formed is fitted with about 6" of Meccano Cord tied at one end only while the other end is passed back through the same hole to form a loop a little over 1" in diameter and loose knotted for subsequent adjustment.

Fitted by its slotted holes at the bottom of the same side of the Plate as the brake gear is a $2\frac{1}{2}$ " Angle Girder which is also bolted four holes in from the edge of the $5\frac{1}{2}$ " x $3\frac{1}{2}$ " Flat Plate, as shown in Fig. 5. The near-side gearbox plate is produced in the same way, but without brake gear.

Winding barrels for the hoist and luffing gear are made from $3\frac{1}{2}$ " Rods, each fitted with a 1" fixed Pulley and a 50t Gear Wheel. Both shafts revolve at identical speeds so either can be used for luffing or hoisting — perhaps the rear shaft being preferred for hoisting to reduce the forward angle to the guide Pulleys at the foot of the mast — the 1" Pulleys are fitted boss inwards and spaced with Washers from the gearbox plates to lie directly underneath the brake levers. The 50t Gear Wheels are staggered, however, to permit gear engagement. The front winding shaft 50t Gear Wheel is fitted boss inwards, while the rear shaft Gear is fitted boss outwards. A spacing Collar is included to set in the toothed edge of the Gear about $\frac{3}{4}$ " from the side plates. Both shafts can be seen in the close-ups and they lie in the front and

rear holes of the $2\frac{1}{2}$ " Flat Plates exactly half-way up.

A fixed counter shaft made from another $3\frac{1}{2}$ " Rod receives the drive from the Steam Engine via the $\frac{3}{4}$ " Sprocket on the Steam Engine shaft, and 1" Sprocket on the far side of the gearbox. About 10" of Chain is required for this connection. On the near end of this counter shaft, which is mounted top centre of the $2\frac{1}{2}$ " side plates, a $\frac{1}{2}$ " Pinion with a $\frac{3}{4}$ " face is fixed. To complete the gearing, a $4\frac{1}{2}$ " Rod is mounted between the two winding shafts and is fitted with a 25t Pinion which engages the 50t Gear Wheels on the winding shafts according to the setting of a gear-shift lever. This shaft is free to slide in the gearbox side plates over a limited range.

The gear-shift levers are fitted to complete the mechanisms in the gearbox area. That which engages the Dog Clutch for slewing is a $3\frac{1}{2}$ " Strip fitted with a short Threaded Pin at its rear end and a standard Bolt locked in place with a Nut, three holes along from the Threaded Pin. Its shank, pointing downwards, engages in the slot of the Socket Coupling, but must do so without binding or offering excess pressure. The inner end of this $3\frac{1}{2}$ " Strip is lock-nutted on a $\frac{1}{2}$ " Bolt to a 1" x $\frac{1}{2}$ " Angle Bracket, mounted on the top rear corner hole of the far side plate. Its long lug passes through the Sprocket Chain loop and its slotted hole receives the Bolt and lock nuts on which the shift lever pivots. Packing Washers are used to keep the engagement Bolt shank at the right height for clean engagement in the Socket Coupling slot. The lock-nutted Bolt should be tight enough to prevent the shift lever from wandering when set in the slew position.

No evidence of the gear-shift lever for the winding barrels is shown in the original Steam Engine Manual picture of SML 6a, but at this stage, the only surplus parts left over after catering for the rigging blocks are a $1\frac{1}{2}$ " Double Angle Strip, two Cranks, a $2\frac{1}{2}$ " Strip, a $2\frac{1}{2}$ " Rod, a Threaded Pin and some Nuts and Bolts. However, turning over to page 16 of the Steam Engine Manual, we see the identical set of components used on the Steam Digger for a gear-shift lever mechanism. This can be seen clearly in the illustrations in Fig. 4. The $4\frac{1}{2}$ " Rod used as the gear-shift carries three Collars at its right-hand end. Two of these are fixed and sandwich the third Collar which is not locked to the shaft. Instead, it carries a standard Bolt, partly inserted into one of its tapped holes and

secured by a lock-nut. The Bolt shank is held by its head in the slot of one Crank, but is free to ride in the slot. The $1\frac{1}{2}$ " Double Angle Strip is bolted to the large Flat Plate as shown in Fig. 4 and acts as a journal for the $2\frac{1}{2}$ " Rod. The forward end of this carries the second Crank extended by the last $2\frac{1}{2}$ " Strip and topped by the remaining Threaded Pin. Finally, the Cord loops on the brake levers are passed round the grooves of the 1" Pulleys on the winding shafts and are tied in place with just a little slackness in the Pulley grooves. (A pair of tweezers is very helpful here!)

RUNNING GEAR

For the running gear two 1" Pulleys are mounted on the Threaded Pins at the rear of the crane mast followed by a $1\frac{1}{2}$ " Strip and two Collars as shown in Fig. 4. The mast head is rigged with two more loose Pulleys on a 1" Rod five holes down and held in place by Collars, as shown in Fig. 2. The three-sheave luffing block at the head is made from two $3\frac{1}{2}$ " and two $2\frac{1}{2}$ " Strips spaced by four Washers in each gap. These are placed on $1\frac{1}{2}$ " Rods held in place by Collars as shown and the complete block pivots on a 1" Rod, one hole below the mast top.

Four $2\frac{1}{2}$ " Strips form the jib head block frame and this is clear from Fig. 3. A fixed 1" Pulley is held on a 2" Rod in the lower row of holes in the Flat Girders, five holes from the top, and this shaft must be free to revolve, being held in place, without pinching, by Collars and Washers. The upper hoist block is clear from Fig. 3, two $2\frac{1}{2}$ " and a central 3" Strip separating the two loose 1" Pulleys held on a 1" Rod. All blocks mentioned use four-washer spacing. Two $2\frac{1}{2}$ " Triangular Plates form the main hoist block, being spaced at three corners by $\frac{3}{4}$ " Bolts and Nuts. A pair of $2\frac{1}{2}$ " Strips form separators across the top of the

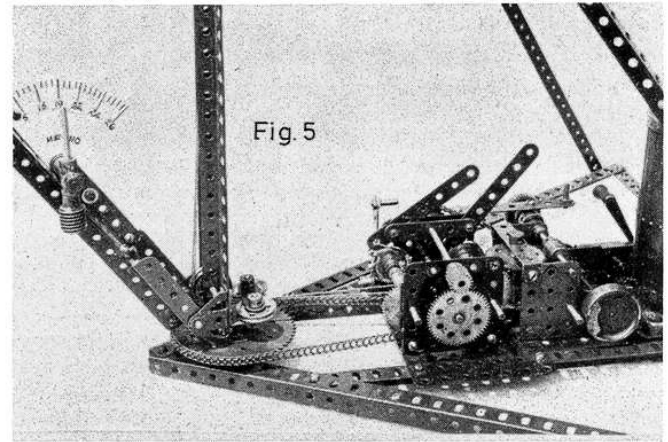


Fig. 5

block and these are allowed to 'float' as the $\frac{3}{4}$ " Bolts do not allow satisfactory Washer spacing.

Meccano Cord is attached to both winding barrels by a simple overhand knot round the Rod and then securely tied to the Bolts or Set Screws in the 1" fixed Pulleys. Both hauling ropes pass through the first pair of horizontal guide pulleys together. The model here is illustrated fully rigged, but, again, even with the Steam Engine running at full speed, luffing and hoisting motions are slow and nothing like scale speed. To get some life into the model it is necessary to run the rigging back to single pulley working on all blocks. Fortunately the old Meccano Steam Engine still has plenty of power to cope.

Parts List for Super Model SML 6a

The following parts list is a correction of that originally published in the 1930 Steam Engine Manual. Where the original number of parts required was in error, the error figure is shown in brackets.

PARTS REQUIRED

| | | |
|-----------|-------------|--------------|
| (3) 5-3 | (9) 8-18a | 43-59 |
| (3) 2-4 | (4) 5-18b | 3-62 |
| 15-5 | 3-22 | 1-63 |
| 4-6 | 17-22a | *(1) 0-63d |
| 1-6a | 1-25 | 2-72 |
| 4-7 | (1) 0-25a | 2-76 |
| 5-7a | (0) 1-26a | (26") 30"-94 |
| 4-8 | 2-27 | 1-95b |
| 2-8a | 2-27a | 1-96 |
| 8-9d | 2-31 | 2-96a |
| 2-9f | 2-32 | 4-103 |
| 2-12a | 82-37 | 3-111 |
| 1-12b | (12) 20-37a | (1) 2-111a |
| 1-15 | 66-38 | (0) 3-111c |
| 2-15a | 2-40 | 4-115 |
| 3-16 | 1-48 | 2-126 |
| (3) 1-16a | 1-48a | 1-144 |
| (0) 1-16b | 1-52a | (0) 1-171 |
| (3) 4-17 | * 1-57b | |

1 Meccano Steam Engine 1930

* This is the only obsolete part (Large Loaded hook)

** 63d did not exist in 1930.