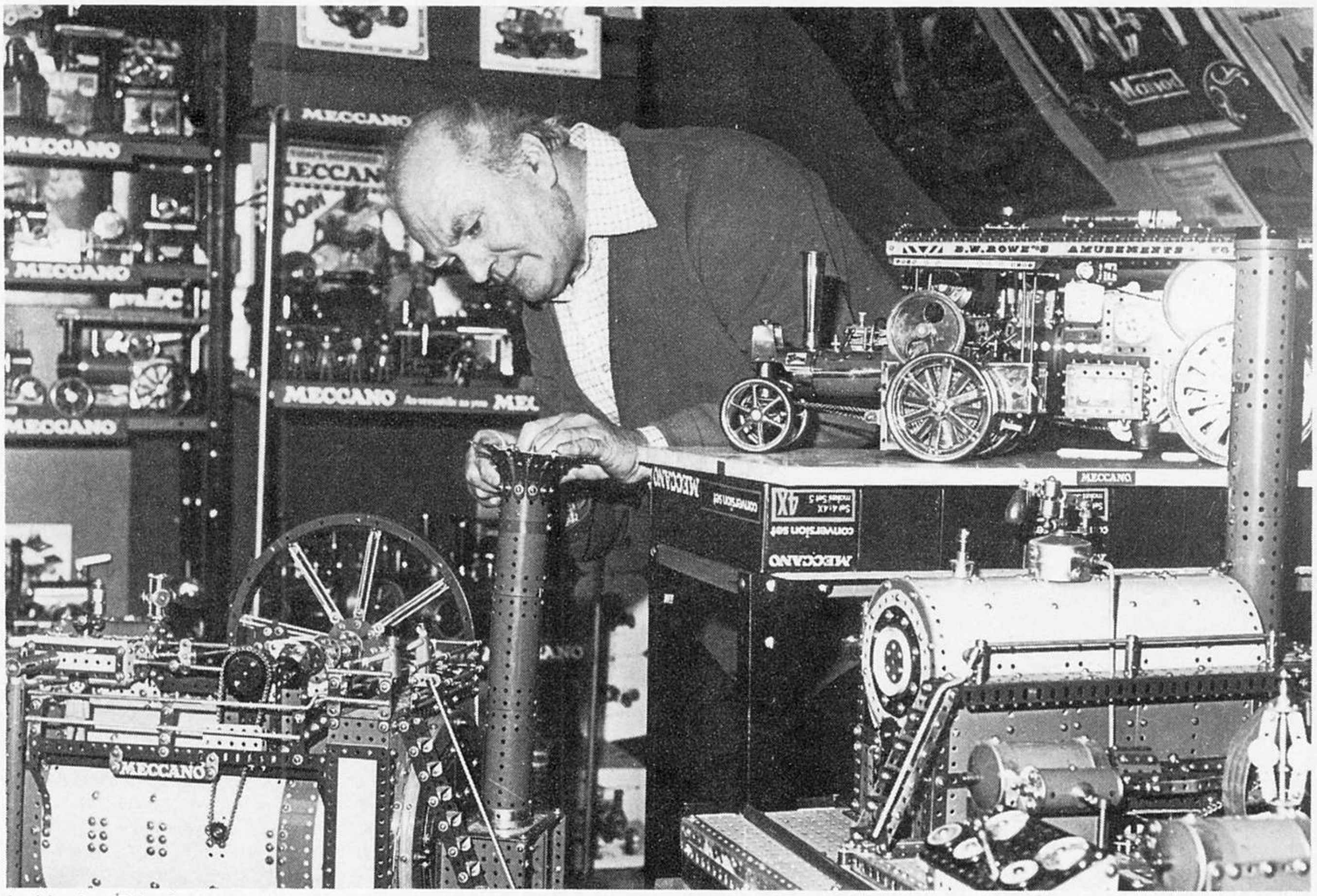
Advanced Meccano enthusiast BRIAN ROWE gives an account of his

50 Years With Meccano



In this view Brian is at work in his Meccano 'den'. Note the Showman's Engine to the right, and the two large Steam Engines in the foreground.
(Photograph reproduced by courtesy of Western Morning News Co. Ltd.)

'LOOKING back, little did I realise the year 1929 was to become a milestone in my life, the effects of which remain with me to this day. It was the year I was given a small Meccano set, and from little acorns . . .

My first acquaintance with the products of Binns Road was as a schoolboy on a trip from my home town of Buckfastleigh in south Devon to visit an Aunt in Totnes. She was a school Headmistress with very fixed ideas on how a boy's mind should be developed and could readily appreciate the educational value of a No. 0 Meccano set I'd set my heart on in a local toyshop window. This, the only Meccano dealer in Totnes at that time had the unforgettable name of Paul Pinch and his shop window was always a feast of Hornby and Meccano, plus the odd wireless set and other electrical goods (he was an electrician by trade). Binns Road products had pride of place in his display with working models and Hornby layouts a year-round attraction. My first Meccano set lay propped in a corner of the window price 5/- (25p), and contained such delights as a plum red base plate, dark green strips and a square tin in which nestled nuts, bolts and other sundry pieces.

This was purchased on the occasion of my birthday by my Aunt with the proviso that I should 'start building from the front of the Instructions Book at model No. 1—and don't drop any nuts and bolts on the floor'!!

My excitement knew no bounds from that day on—I knew there were spare parts to be had, but 2d and 3d in those days was beyond my resources so Christmas was eagerly awaited for the gift of a 2" Pulley and a small tin of Nuts and Bolts. Luckily my Father was always sympathetic to my constant demands for more stock and very gradually my collection increased in size until I was able to build models from the No. 3 Book. Father encouraged me to study each individual part and design my own models so later on I found myself increasingly adept at utilising the various applications of each component. This in turn led to an increasingly demanding eye for scale proportions and attention to detail. West Country people seem to have an inherent skill in this direction, coupled with a love of colour and no shortage of patient endeavour. This may account for my love of the Fairground, strong connections with Cornish mining engineering and an attraction to all things steam.

The '30's saw me at Ashburton Grammar School where I won my first prize of 2/6d at a Hobbies Exhibition with my hand-driven Meccanograph. I was later told my model gained this prize because all the parts were well chosen, fastened together tightly and worked together properly. This was a great encouragement at the time and led to my trying so far as possible to maintain these qualities in every model I made from that day to this.

I left Grammar School in 1938 and joined the RAF as an apprentice Aero Engine Fitter during which time I missed the 'Blue-Gold' Meccano period. This, to all intents and purposes, was an 'economy' step by Binns Road—the gold-finished strips soon scratched and it is rare to see any of these in good condition today. The war years saw me in various parts of the country including South Wales but there was no time to pursue my hobby until my medical discharge in 1945. Returning to Devon I once again recovered my box of Meccano, but sadly to relate, wartime evacuees had played

havoc with my collection. I was obliged to wait until 1946/7 for the first opportunity to replenish my stocks; it was a poor time for spares availability because with export all the rage, Meccano were hard put to supply the home demand.

Gradually though, my outfit 'recovered', to the extent that I was able, in 1952, to enter my first official Meccano competition with a model of an LMS Stanier Pacific Locomotive, aptly named the 'Duchess of Devon' and this gained me second prize. This modest success spurred me on and I became dedicated with a desire to build bigger and better with novelty forming the keystone of all my efforts. Next followed a Planing Machine which was described in detail in the October 1952 'MM' with my production line now geared for greater output. Early in 1953 I entered five models for the International Model Building Competition in the 'MM', to my delight, I carried off the first prize in the senior section. One of the models I submitted, a working duplicator, is shown in the New Cavendish Book 'The Products of Binns Road'. It was about this time that my only visit to Binns Road took place. It was in the Autumn of 1953 when I met Frank Riley—the then Editor of Meccano Magazine and also the late Norman Tudor (Spanner of the time) for a conducted tour of the factory.

Letters came to me from all over the world including one from a Saudi Arabian Prince who wished to know if I could build him a duplicator for his personal use! I began making Showman's Traction Engines and Fairground Rides to indulge my love of these machines, and these models were featured in the 'MM' throughout the '50's and '60's. These culminated in my giant Fowler 'Supreme', thought by many to be out of proportion in some respects—and I agree with these comments!

At this time I was Manager of five Railway Bookstalls covering Exeter, Newton Abbot, Dawlish and Teignmouth where I was able to spend some of my time admiring many of the fine steam locomotives which passed through these stations. One day the Chief Mechanical Inspector asked 'Why not build some of the GW Locomotives in Meccano and display them outside your Bookstalls at Exeter and Newton Abbot?' My employers, Messrs. Wymans, were also enthusiastic about the idea so this was the start of my 'Railway Workshop'. Soon my production line was turning out such models as 'City of Truro', 'King George V', 'Lord of The Isles', (broad gauge) and 'Tiny', the last original broad-gauge engine which stood on its plinth on the down platform at Newton Abbot station.

Brian's incredible 'Evening Star' 2-10-0 Locomotive.

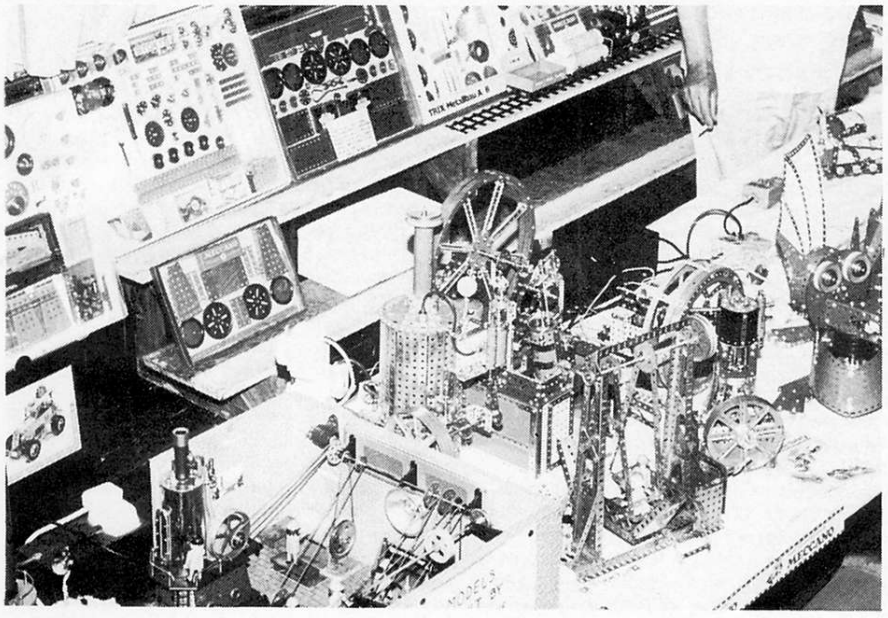
Following after these were 'The Great Bear', the only GWR Pacific Locomotive 'County of Devon' and even a working model of Brunel's Atmospheric system of the old South Devon Railway. This, for a short time, carried passengers along the sea wall between Exeter and Newton Abbot until it was finally scrapped as a fiasco. The original 'City of Truro' made a visit to Devon on a special excursion in May 1957 and my eight-foot Meccano model preceded it by several days at the Newton Abbot bookstall. Rapturous youngsters were photographed sitting in the tender of my model whilst the real thing simmered a few yards away. The two bookstalls at Exeter and Newton were in constant use as Meccano display areas and some actually on the stalls, such as a Funicular Railway which delivered books from the top of the incline to the bottom pay desk. No Christmas ever passed without some Meccano model embellished with coloured lights being on view to the public gaze, to the obvious delight of all!

Nationalisation introduced a different class of locomotive to the West Country and the Britannia class 'Vulcan' was modelled and exhibited. During the early sixties, the last steam loco to be turned out from Swindon, a massive 2-10-0 named 'Evening Star'—came on to western metals and I then decided to draw up plans to see if I could create a model worthy of the last steam loco to be built in Britain. This led me into a great deal of research as at the time it was by no means certain if Meccano could successfully complete such a large envisaged model. It was decided to go ahead and build 'The Star', but a few non-Meccano parts would have to be incorporated to maintain correct proportions. The resulting twelve foot model was described in the June 1970 'MM' and this was the culmination of my steam locomotive building. It was duly photographed but never left my modelling shed—it was too big to move safely, even to take across to the Station only a few yards from my house!

With the passing of steam from British Railways, except for special excursions—I was relieved to learn that the original 'Evening Star' was to be preserved but my Meccano model was destined to be dismantled and the parts dispersed to my storage cabinets for future use in other constructions. I then decided to explore another favourite subject, old Cornish Beam and Whim Engines, Mill Engines, and even copies of vintage toy engines culled from the pages of old catalogues. And so production centred on old Bing and Marklin products, even a copy of the current Willesco twin cylindered mill engine. The fascination of the Fairground also stirred my imagination still, and as a result the 1975 Henley Meccano Exhibition saw me with my model 'Marenghi' organ and a scenic Showman's Engine. The organ was named 'The Meccano Music Master' and was fitted with flashing coloured lights, taped authentic music, a working Bandmaster with baton, drums, cymbals and even a xylophone.

During the past ten years my time has been absorbed by my mobile exhibitions of Meccano models, my steam engine collection and vintage Hornby and Meccano including old literature and price lists etc. I attend Model Engineering exhibitions, Fetes, Traction Engine Rallies and Agricultural shows. My estate car is always

Part of Brian's display in Launceston, Cornwall, Autumn 1979.



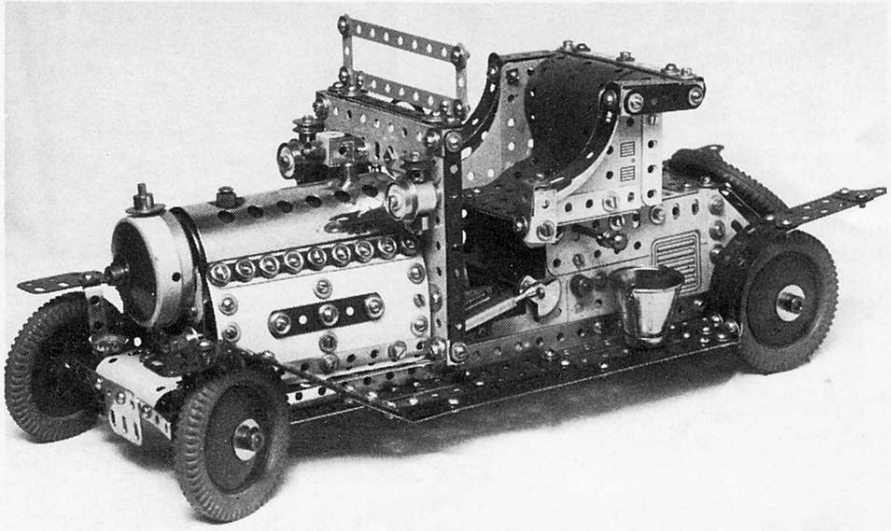
packed to the roof with models and all the ancillary equipment one needs to give a worthwhile display. My model fairground has been featured on Westward and BBC TV as has also my vintage Meccano displays and steam-driven workshop. The organisers of the various exhibitions know me well and always allow me a generous area in which to 'set-up'. This is usually several trestle tables with a mains electric supply and water for the 'workshop' driven continuously by the Willesco unit which incorporates a constant feed pump to maintain power throughout the show. Plenty of Meccano streamers, shelf cards, box lids are employed around the stand and the whole effect is one of colour, motion and music, plus the aroma of hot oil and steam! Marvellous for youngsters and grown-ups alike!

My next Meccano show for 1981 will take place at the seat of Lord Clifford of Ugbrooke House, Chudleigh, Devon and will run from May to September. This stately home has only been opened to the public since last year and is situated in a beautiful part of Devon approx. eight miles from Exeter on the Torbay road. As well as a comprehensive display of static Meccano models—I shall personally be in attendance at peak times with several working models including the following:—

1. Showman's scenic road Locomotive 'Big Bertha' constructed from Red/Green/Yellow/Black Meccano with all Brass items polished and lacquered.
2. Meccano steam car in Red/Green/Yellow colours. Fitted with working differential clutch and correct steering. Polished brass Headlights and other fittings.
3. Giant Big Wheel driven by a Mains motor with coloured lights.
4. Several animated models constructed from all the colour variations in the Meccano system from the thirties to date.
5. A working Fairground Organ in the course of being built.

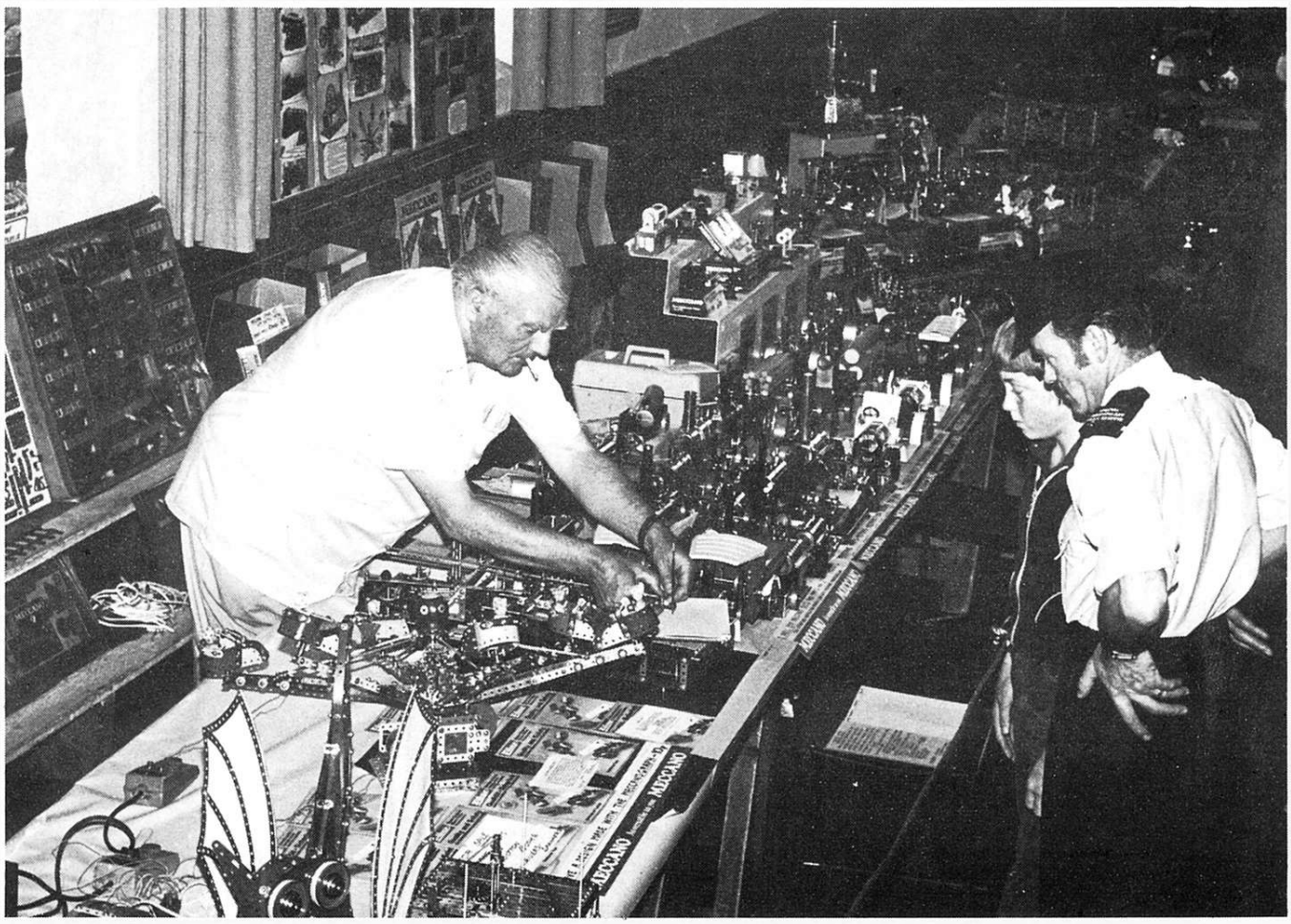
To sum up, my approach to Meccano model building has remained constant from my formative years—a dedication to the product. Meccano has been and still is, unsurpassed by any competitor. It is well-made, probably too well made in this changing world, I have come across parts manufactured over 70 years ago and been able to incorporate them in my work without hesitation.

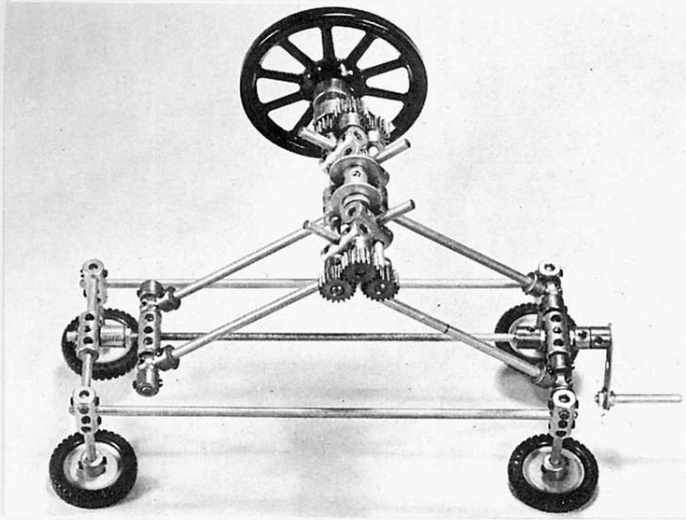
My satisfaction is derived from the seemingly endless questions I'm asked regarding my hobby, and a sense of fulfilment when I have completed a visually attractive model that works and works well. I still even today, add to my collection of Meccano which I now value at several thousand pounds. I revel in the acquisition of a rare component found in a pile of rusted and bent parts, it can be likened to the thrill of the chase, sometimes to faraway places, this makes it all worthwhile. So, thank-you, Frank Hornby, you helped shape my life!

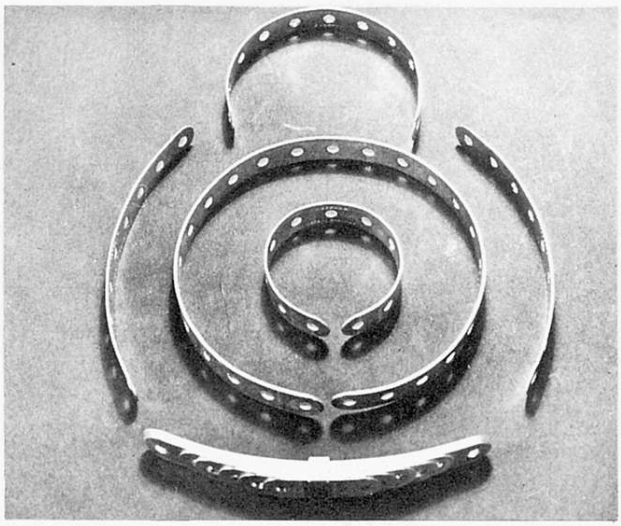


Above: Meccano Steam Car. This uses the Meccano Steam Engine, (previous pattern-without whistle). Fitted with gearbox and differential, the model employs a chain drive to the rear axle and access to the fuel tray is facilitated by the removable front number plate and bumper unit.

Below: A typically large and comprehensive display by Brian, all the more remarkable as it is all the work of just one man. In this view we can see Meccano working display models, old Meccano products, Hornby tinplate and a selection of Steam Engines.







STRIP-ROLLING MACHINE

A practical unit designed by "MECCANOMAN"

In Meccano modelling, it is at times required to curve Strips to an even radius. When this is attempted by hand, uneven results stem from the tendency for the Strip to bend in a series of kinks at each hole. It is also very difficult to maintain the curve smoothly to the extreme ends of the Strip.

The Strip Rolling Machine described here has been designed to have its rollers mounted as close as practicable so as to ensure smooth curving of the Strip between its holes. The choice of ½" centres allows all three rollers to be driven together through a chain of ½" Pinions which ensure smooth passage of a Strip through the rollers with the minimum of slip; it will even be found that painted Strips can be curved to quite an extent with minimul damage to the paint. However, in all cases where sharp radii are required, the Strip concerned should be curved in a succession of operations of gradually increasing severity.

The machine is also equally efficient in straightening the Strips after they have fullfilled their function. In addition, mutilated Strips can very often be restored by curving them gently first one way and then the other, thus gradually reducing the damage until straightness is achieved once more.

CONSTRUCTION

THE ROLLERS

Construction is commenced with the top roller assembly which consists of a 3½" Rod with a centrally-mounted Short Coupling, on either side of which are placed, in order: a 3/4"Washer, a 3/8"Washer, two Couplings by their end transverse holes; then a further 3/8" Washer, and finally a ½"Pinion, boss inwards.

The lead-in roller assembly is formed of a further 3½"Rod which passes through the other end transverse bores of the inner pair of Couplings mentioned above. This also carries a centrally-mounted Short Coupling, and ½"Pinions, boss inwards on both ends.

The feed-out roller assembly is a 4" Rod, this time through the end transverse holes of the outer pair of Couplings, with a central Short Coupling as before. On one end is a ½"Pinion, boss inwards, with one spacing Washer. On the other end, the additional ½" length allows the relevant end ½"Pinion to be mounted boss outwards. The boss of this ½"Pinion is then inserted into one recess of a Socket Coupling, whose other recess carries the boss of a Spoked Wheel, which acts as actuating handwheel. *All* tapped holes in both Pinions and Short Couplings are fitted with Grub Screws, those in the Short Couplings must be 3mm [69c] to ensure an unobstructed rolling surface.

THE OPERATING LEVERS

The four operating levers are formed of 3½"Crank Handles, which must be carefully selected to be identical in length, and in the profile of their bends. The use of these Crank Handles ensures that a full range of roller positions can be achieved without fouling the 3½"Rods.

The lower ends of the outer Crank Handles are mounted in the bases of Handrail Couplings whose transverse bores rotate freely on 1½"Rods which form part of the base frame assembly. These Rods are connected by Couplings at their inner ends, and carry vertical Couplings at their outer ends to act as leg supports. Collars are fitted against the inner faces of the Handrail Couplings for location purposes.

THE BASE

The other end of the base frame assembly is similar, but carries no Handrail Couplings or Collars. The sides of the frame are 8"Rods located in the central tranverse bores of the vertical Couplings. The legs themselves are 1½"Axle Rods, which carry 1"Pulleys and Tyres as feet.

ADJUSTMENT

The setting of the roller angle is determined by a special assembly mounted on an 8"Screwed Rod, which consists of a Coupling mounted by its central transverse threaded bore. This has 1"Rods protruding from its ends which carry the eyes of two Handrail Couplings, which in turn are retained by Collars. These Handrail Couplings are of course mounted on the lower ends of the inner pair of Crank Handles. Turning of the 8" Screwed Rod thus allows a fine adjustment of the roller angles. This Threaded Rod carries a lock-nutted Adaptor for Screwed Rod whose pin turns freely in the central transverse bore of the horizontal Coupling at one end of the base.

At the other end of the base, the Screwed Rod itself turns in the equivalent bore of the Coupling at that end. The operating handle is a Threaded Crank fitted with a long Threaded Pin as shown, and is lock-nutted to the end of the Screwed Rod. Endplay is controlled to close limits with a Threaded Boss, which is also locknutted.

A few examples of work done by the machine are shown. It will be seen that various lengths of Strips can readily be rolled into complete circles. The laminated spring, produced with the aid of the machine, is interesting, as it seems to have acquired additional resilience in the process; it will return to the camber shown even after being deflected until 'flat'. In passing, I should mention that its buckle is a Short Circuit Piece [Electrical Part 554]; the various leaves are kept in alignment by a long Grub Screw through the centre holes of the leaves, which is retained in place by the buckle.

PARTS REQUIRED

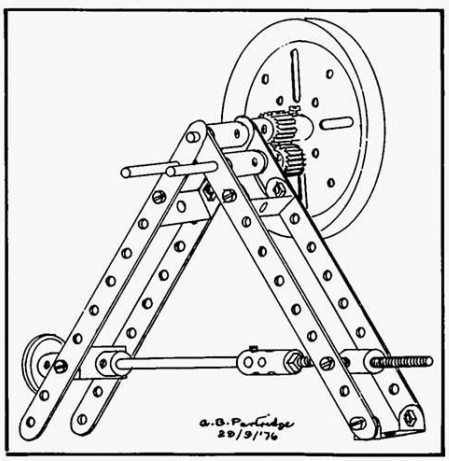
2 — 13a	6 — 26	1 — 64
1 — 15b	3 — 37c	1 — 69c
2 — 16	5 — 38	1 — 79
8 — 18a	2 — 38d	1 — 115a
2 — 18b	4 — 59	4 — 136a
1 — 19a	1 — 62a	4 — 142c
4 — 19s	11 — 63	1 — 171
4 — 22	3 — 63d	1 — 173a

AN 'ECONOMY VERSION'

by ALAN PARTRIDGE

This device is closely based on the foregoing machine which I have found so useful. My version contains the minimum of expensive brass parts, but is not so robust as 'Meccanoman"s.

The construction should be clear from the diagram after reading the description of the 'Rolls-Royce' version.

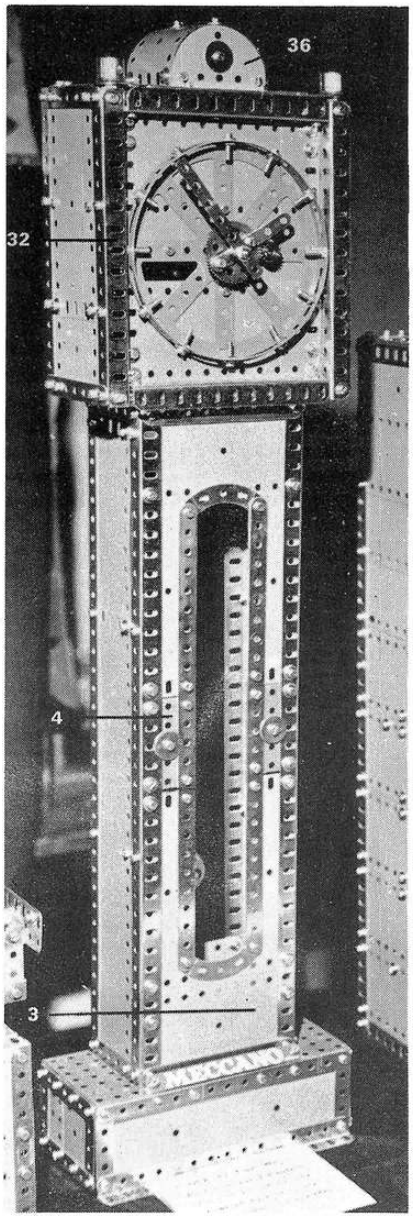


GRANDAUGHTER CLOCK

An advanced working timepiece designed and built by MMQ reader ROGER WALLIS

EVERYBODY HAS heard of a Grandfather Clock – in fact, we featured a superb example of one in the MMQ a couple of years ago – but what exactly is a *Grandaughter* Clock? Answer: a mini-sized Grandfather!

Take, for instance, this appealing model, designed and built by Roger Wallis of Solihull, West Midlands. At a glance, it *looks* like a Grandfather Clock, but if you were to put it alongside Bert Love's Clock, featured in the October 1973 magazine, you would instantly see the difference: Bert's model stands over 7ft high; this is a charming 2½ feet high! Small in comparison, it might be, though, but it is still an advanced and fully-operating timepiece, capable of running up to 24 hours on one winding. It is built from a No.9 Set, combined with a No.2 Clock Kit, plus four additional Fishplates, and it is driven by a Meccano No. 1 Clockwork Motor.



BASE AND TRUNK

Beginning construction with the base section of the clock case, this is a 7½" x 3½" x 2½" box assembly built up from three 3½" x 2½" Flanged Plates 1, forming the top, and with the front, back and sides provided by Flexible Plates edged by Strips and Girders. The front, built up from two overlapping 4½" x 2½" Flexible Plates (edged along the top by a 7½" Strip, along the bottom by a 7½" Angle Girder and along the sides by two 2½" Strips) is bolted direct to the flanges of Plates 1, as also is the back which is built up from a 5½" x 2½" and a 2½" x 2½" Flexible Plate, edged at top and bottom by 7½" Strips and at the sides by 2½" Strips. Each side, supplied by a 2½" x 2½" and a 2½" x 1½" Flexible Plate, edged at the top by two overlapping 2½" Strips, at the bottom by a 3½" Strip and at the sides by 2½" Strips, is attached to Flanged Plates 1 by the black Angle Brackets in the Clock Kit.

Turning to the case trunk, front corner uprights for this are provided by two 18½" Angle Girders 2, with the rear uprights being 18½" compound angle girders, each built up from two overlapping 12½" Angle Girders. Each front upright is connected to the rear upright by two 3" Strips, one bolted between the lower ends of the Angle Girders and the other one hole from the upper ends. The sides are then each filled in by a 12½" x 2½" Strip Plate, extended by a 5½" x 2½" Flexible Plate, the resulting compound plate being bolted direct to the rear upright Angle Girder, but attached to the front Angle Girder by three Fishplates spaced at intervals along the plate.

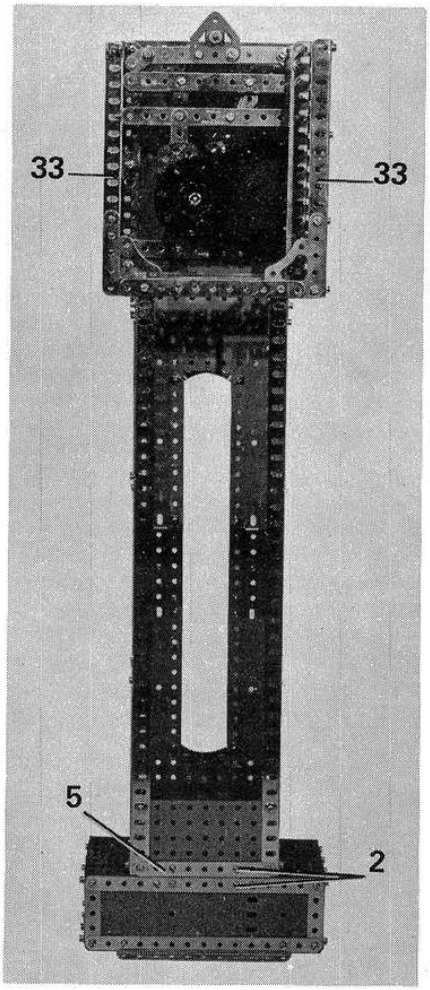
Fixed between the two front Girders 2 are two 4½" Strips one bolted at the lower ends and the other bolted one hole from the upper ends, the securing Bolts in each case helping to hold a 4½" x 2½" Flexible Plate 3 in position. With the exception of a long "window" to later allow observation of the pendulum, the remaining space is then enclosed by a 4½" x 2½" Flat Plate, behind the lower Flexible Plate but projecting upwards two holes, and four 5½" x 2½" Flexible Plates arranged in two uprights pairs, the Plates in each pair separated centrally by a 2½" x 1½" Flanged Plate 4. The inner edges of the Plates – and thus the "window" – are edged by two 12½" Strips connected at top and bottom by a 2½" Stepped Curved Strip. A ¾" Washer is fixed to the centre of each Flanged Plate 4 to provide added decoration.

At the rear of the trunk, a 4½" x 2½" Flat Plate and a 4½" Strip 5 are bolted between the upright girders as shown, then the completed trunk is attached to the base by two Angle Brackets at the front and two Fishplates at the rear.

MECHANISM FRAMEWORK

Surmounting the trunk is the framework for the clock mechanism and care should be taken in building this to ensure that the whole thing is rigid and perfectly "square". The inner framework consists of two similar arrangements, each built up from two upright 7½" Angle Girders 6 connected together at their lower ends by a 5½" Strip 7, then the 7½" Strips in each arrangement are themselves connected together at their upper and lower ends by 2½" Strips 8. Note, however, that the Girders are *spaced only two inches apart*, the 2½" Strips projecting one hole forward in each case.

Bolted inside the rear pair of Girders 6, three holes from the top, is another 5½" Strip 9, *this being spaced from the Girders by a Collar and two Washers on each securing ¾" Bolt.* A 4½" Strip 10, extended at each end by a Fishplate, angled downwards as shown, is attached by ¾" Bolts through the second holes from the top of the Angle Girders, a Collar and three Washers on each Bolt acting as spacers in this case. Two upward-pointing Flat Trunnions 11 are centrally bolted, one to each side of the 4½" Strip, while a 2½" Strip is attached to the centre inside of 5½" Strip 9, being spaced from it by a Washer on the shank of each securing Bolt.

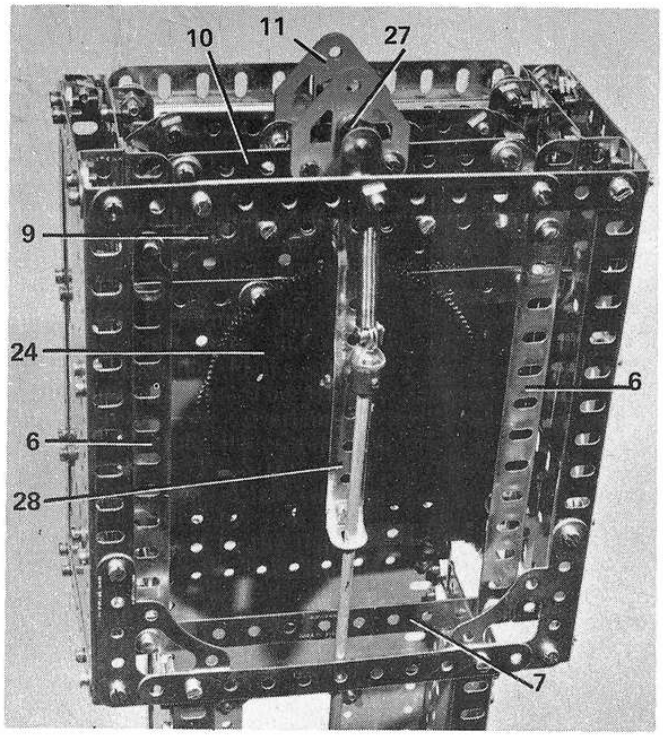


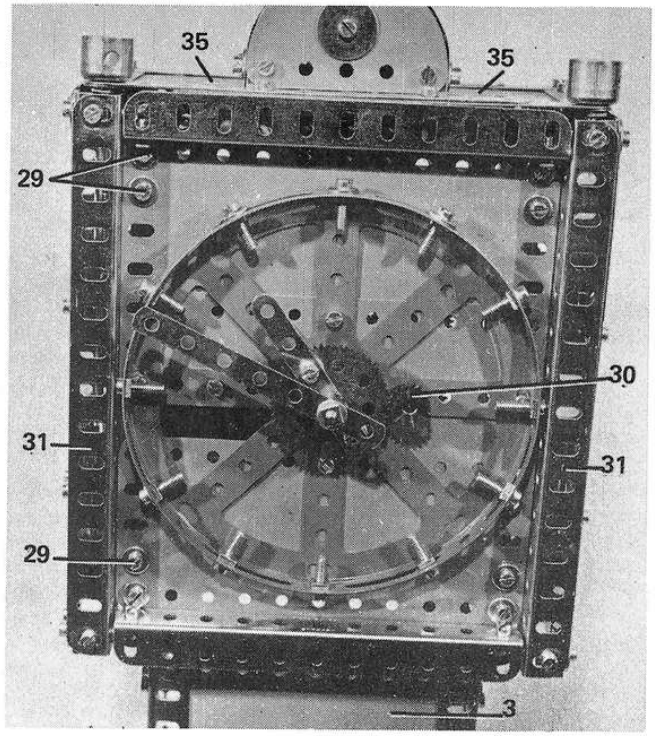
Similar 4½" and 5½" Strip arrangements are bolted between the front frame Angle Girders, with the difference that 3/8" Bolts are used to fix the 5½" Strip (numbered 12) and only three Washers are used on each Bolt for spacing purposes.

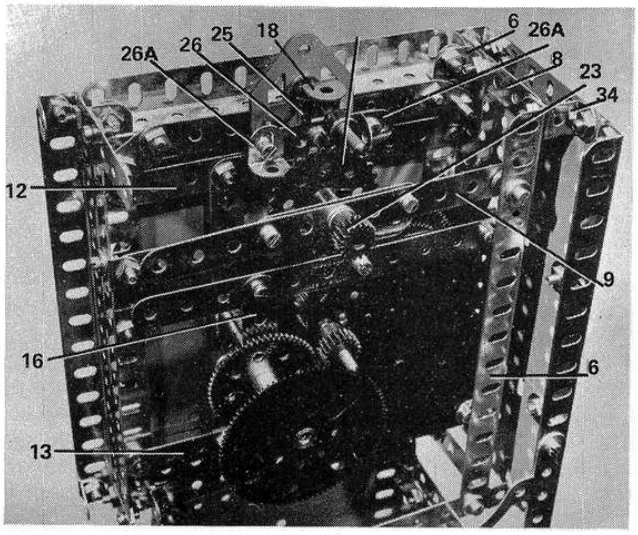
The clock is powered by a No.1 Clockwork Motor, but, before fixing the Motor in position, it is advisable to ensure that it is well, but not over-oiled, paying particular attention to the spring coils and ensuring that they do not bind as they unwind. The Motor, switched to normal running with key shaft to the front, is fixed to right-hand Angle Girders 6 by four Angle Brackets, secured through the fourth and eleventh holes from the bottom of the Angle Girders. The upper edges of the Motor side plates are overlayed by 5½" Strips, the protruding ends of which are connected to left-hand Girders 6 by Angle Brackets.

Next, a 5½" Strip 13 is fixed by 1/8" Bolts between front 7½" Girders 6, but is spaced from the inside of the Girders by three Washers on each securing Bolt. Bolted between this Strip and Strip 12, four holes from the left-hand side, is another, vertical,

Above, a general rear view of the partially-completed Grandaughter Clock. Note that one of the corner mechanism framework Girders has been removed in this view. Below left, a close-up view of the back of the clock mechanism and, below right, the completed clock face.







In this close-up view of the Grandaughter Clock mechanism one of the framework corner Girders has been removed to allow the camera to see more of the internal arrangements. The pendulum and driving 3½" Gear Wheel have also been omitted for the same reason. Construction is not as difficult as it may seem.

←

5½" Strip, through the fourth hole from the bottom of which two Fishplates 14 are fixed, one on each side of the Strip, using the Fishplates' slotted holes. The round holes in the Fishplates will later supply one bearing for a Rod, the other bearing for which is provided by the corresponding holes in two more Fishplates 15 fixed one each side of a vertical 3½" Strip 16 bolted to the upper horizontal 5½" Strip edging the Motor side plates and to a 1½" Strip fixed to the nearby Motor side plate.

CLOCK MECHANISM

At this stage the clock mechanism can be tackled, but, before building begins, it is essential that all of the Axle Rods are brought to a high polish by means of a proprietry metal polish. (In the prototype, "Duraglit" was used). Also, to ensure absolute minimum friction, where Washers are specified for spacing, the domed side of the Washer should rest against the bearing, and where more than one Washer is used, they should be placed back to back so that the domed sections bear against the gear and bearing.

The mechanism itself is not excessively complicated. The motor output shaft is removed and replaced by a 2" Axle Rod on which a ½" Pinion 16 is fixed. This Pinion meshes with a 2½" Gear Wheel 17 on a 2" Rod journalled in Fishplates 14 and 15, the Gear being spaced from the nearby Fishplates by three Washers. Also mounted on the Rod, between the Fishplates, is a ½" Pinion 18 which is loose on the Rod, but which is held in the jaws of a Small Fork Piece 19 fixed on the Rod. The Fork Piece must grip the Pinion firmly as this arrangement serves as the friction drive to the hands. In mesh with the Pinion is a 57-teeth Gear Wheel 20 fixed, boss outwards, on the minute hand shaft – a 3" Rod journalled in the holes in the Motor side plates beneath the motor output shaft. The Gear is spaced from the Motor by two Washers. Fixed on the shaft, behind the motor, is a 7/16" 15-teeth Pinion spaced from the motor by one Washer. This Pinion meshes with a 60-teeth Gear Wheel 21 mounted, boss outwards, on a 2½" Rod 21A held by a Collar in the vertical 5½" and 3½" Strips 16. (The 60-teeth Gear hides the 7/16" Pinion from view in the illustrations).

The escapement wheel is a 1½" Sprocket Wheel 22 which is mounted on a 2" Rod journalled in the centre holes of Strips 9 and 12 and in the overlying 2½" Strips, where it is held in place by a ½" Pinion 23, with Washers being used as spacers. Double Grub Screws are used in the Sprocket Wheel to ensure that it runs as concentrically as possible. If a long-running, i.e. 24 hours, clock is required, the escapement wheel must be double checked for concentricity and freedom from binding. Care taken here will pay dividends when the finished clock is set in operation. In mesh with the Pinion is a 3½" Gear Wheel 24 fixed on the motor output shaft using Double Set Screws. Note that there is an absolute minimum clearance between the faces of this Gear and 2½" Gear 17.

The mechanism should now be tested by running the Clockwork Motor, while watching for tight bearings, accurate gear meshing, and ensuring the gears run true. Any rough running is now removed by polishing the shafts once again, adjusting bearings by loosening fixing Bolts and re-tightening, etc. As a guide to the setting up of the mechanism – on a run-down motor, the prototype clock needed only one complete turn of the winding key to enable the escapement wheel to spin.

ESCAPEMENT

We come, now, to the escapement itself. A Slide Piece 25 is slipped over the long lug of a 1" x ½" Angle Bracket, to the slotted hole of which a 5-hole 2" Strip 26 is bolted by its centre hole. The Strip pushes firmly against the Slide Piece to make one solid unit, then to each end of the Strip an Angle Bracket 26a is bolted, as shown, one of the Brackets being mounted vertically and the other horizontally. The complete assembly is then fixed by means of the Slide Piece boss on a short Rod which is journalled in the centre vertical holes of Trunnions 11, where it is held in place by a Collar.

Mounted on the rear protruding end of the escapement Rod is a Coupling 27, to which a 5½" Strip 28 is bolted. This Strip is carefully bent so that it clears the boss of the 3½" Gear 24, noting that the distance between the Gear and Strip should be equivalent to the thickness of a Washer. An Angle Bracket is bolted to the lower end of the Strip, after which the escapement should be set up and tested. Once again, this needs some patience, but care at this stage will result in long-running.

The Angle Brackets in the escapement are adjusted so that, as one is in the dwell of the teeth of the Sprocket Wheel, the other is just clearing a tooth. When the pendulum Strip 28 is swung over, the second Angle Bracket should now be in the dwell of a tooth, and the first just clearing the next tooth. The Motor can now be wound up and the escapement tried under power. The Angle Brackets are minutely adjusted, as necessary, until only a few turns of the motor key allow the pendulum Strip to swing under the control of the motor.

CLOCK HEAD

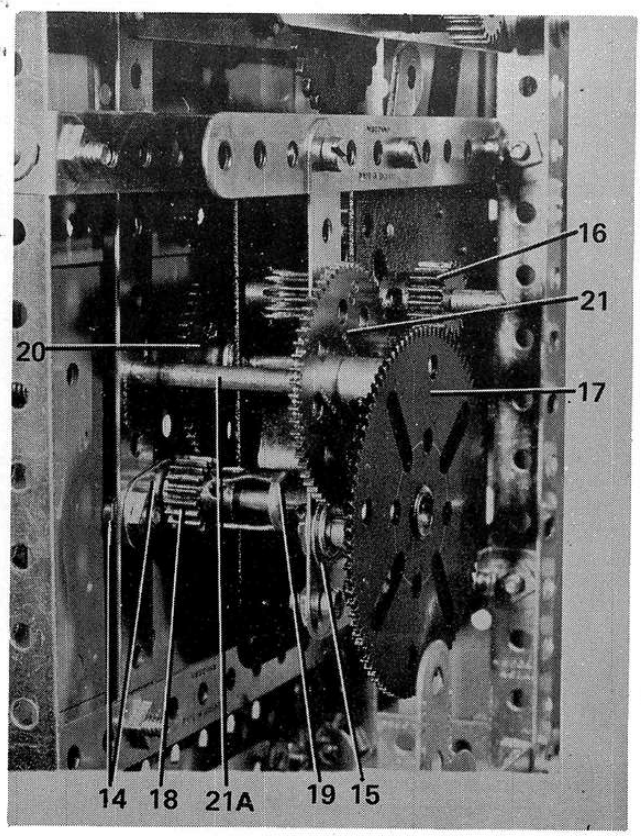
Coming next to the head of the clock the face consists of a 5½" x 1½", a 2½" x 2½" and two 5½" x 2½" Plastic Plates, arranged as shown, and overlayed by a Hub Disc, the complete assembly being fixed to the front 7½" Angle Girders 6 of the mechanism frame using the long Bolts (29) holding the 4½" and 5½" Strips of the mechanism front. These Strips should be removed and refitted with the Plastic Plates in place and, with the mechanisms set up as previously described, it is a relatively simple operation to refit the Strips in their correct positions.

With the clock face fitted, Rod 21A should project through a hole in the face. Fixed on the end of this Rod is a ½" Pinion 30 which drives a 57-teeth Gear Wheel, *loose* on the minute hand shaft which also projects through the clock face. Bolted to the face of this Gear is a 2½" Narrow Strip, spaced from the Gear by two Washers, which serves as the hour hand. The minute hand is a 3½" Narrow Strip, mounted on a Rod Socket fixed on the end of the minute hand shaft. The clock digits are ½" Bolts held in the rim of the Hub Disc by Nuts. Their correct positions are found by placing the two hands at the twelve o'clock position and fixing the first Bolt. One revolution of the minute hand will show the hour hand pointing to the position where the next digit is to be placed, and so on round the full twelve-hour circle.

The sides of the face are completed by 7½" Angle Girders 31 which are bolted to the 2½" Strips projecting from the clock mechanism. The upper and lower sections of the face are framed by two 5½" Angle Girders fixed by Angle Brackets to the uprights of the mechanism.

Each side of the clock head is similar in construction, consisting of a 7½" x 2½" compound flexible plate (built up from one 5½" x 2½" and one 2½" x 2½" Flexible Plate), edged at top and bottom by 3½" Strips attached to the ends of nearby Angle Girders 31 by Angle Brackets. The Bolts fixing the 3½" Strips to the Angle Brackets also secure a vertical 7½" Strip 32 between the two 3½" Strips. The rear ends of the 3½" Strips are connected by a vertical 7½" Angle Girder 33, the compound plate being attached to this and the 7½" Strip by strategically-placed Fishplates. Two ½" Reversed Angle Brackets 34, bolted one through the second hole from the rear of each 3½" Strip, help to fix the head sides to the mechanism frame. At the rear of the clock, Angle Girders 33 at each side are connected, at the top, by two overlapping 5½" Strips and, at the bottom, by one 5½" Strip braced by Corner Gussets.

The top of the clock head is built up from two 6½" compound strips (provided by two overlapping 5½" Strips), connected together at each end by a 3½" Strip. A 2½" x 2½" Flexible Plate 35 is bolted to each 3½" Strip, a 2½" x ½" Double Angle Strip being bolted to the top of the inner edge of this Flexible Plate. Bolted on to the lugs of the Double Angle Strips are two Semi-circular Plates 36, then the top is completed by two 2½" x 2½" Curved Plates attached to the Double Angle Strips by Angle Brackets and arranged to follow the contours of the Semi-circular Plates. Decoration is provided by a ¾" Washer bolted to the centre of the front Semi-circular Plate, and by two Chimney Adaptors, one at each front corner, as shown.



Another close-up view of the clock mechanism as seen more from the side, with the 3½" Gear and nearside corner Angle Girder still removed to allow a clearer view. Note Pinion 18 held in the arms of Small Fork Piece 19, this arrangement serving as a friction clutch to permit the hands of the clock to be turned without damaging the mechanism. Note also that Fishplates 14 and 15 must be set absolutely accurately to ensure that the dependent gears mesh correctly.

It now only remains to complete the pendulum, which consists of a 9" Pendulum Rod from the Clock Kit, a 3½" Axle Rod and an Adaptor for Screwed Rod, all joined together by Rod Connectors. The pendulum is extended downwards by a 6" Screwed Rod held in the Adaptor and mounted on the Screwed Rod is the bob weight. This is built up from six Wheel Discs fixed by ¾" Bolts to a Bush Wheel, the Threaded Rod being screwed through the tapped bores in the boss of this Bush Wheel.

The completed pendulum is inserted through the Angle Bracket attached to the previously-mentioned 5½" pendulum Strip 28, and an End Bearing 37 is fixed on the upper end of the pendulum rod. Finally, a Tension Spring is attached to the End Bearing, the other end of the Spring being fixed by a ½" Bolt to the centre of the compound 6½" strip at the rear of the clock head.

The completed clock can now be tested by winding the Motor and setting the pendulum swinging, after ensuring that the clock is standing firm and upright by adjusting the 5½" Angle Girder at the rear of the base. If the setting-up procedure described previously has been carefully followed, the tick of the escapement should be found to be regular and even. Any discrepancy should be removed by slightly adjusting the relationship between the pendulum and the escapement. A careful study of the escapement Angle Brackets in motion, particularly as the Motor runs down, should detect any minor adjustments that may be needed.

PARTS REQUIRED

2-1	1-16b	2-51	1-166
5-1b	4-17	3-53	1-173a
17-2	1-24	2-53a	1-179
5-2a	6-24a	8-59	2-188
9-3	4-26	1-63	4-189
4-4	1-26c	1-79a	7-190
18-5	2-27a	2-90a	4-191
1-6	1-27b	1-95a	5-192
1-6a	1-27c	2-108	1-194a
2-7a	1-27d	8-111	1-194d
4-8	243-37b	14-111a	2-194e
9-8b	275-37a/c	6-111c	2-197
3-9	134-38	1-116a	2-200
26-10	4-38d	1-118	2-213
30-12	1-43	4-125	2-214
1-12b	2-48a	4-126a	1-235
1-16	1-50	2-164	1-235b
1-16a			1-252

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