HALF-HOUR STRIKE MECHANISM

last of the extra mechanisms fitted to Bert Love's No.10 Grandfather Clock featured in the Oct '73 MMQ.

COMPLETION OF THE No. 10 Outfit Grandfather Clock requires the construction of a ½ hour strike mechanism, the essential details of which are shown in the illustration on the opposite page. After providing chain for the winding and moon drive mechanism about a length and a half are left over which are joined to make the chain drive for the strike. One Boiler remains unused and this is loaded with a small handful of washers, nails, etc. to provide a driving weight. 2½" Axle Rods are passed through the Boiler Ends to hold them in place and are secured with Spring Clips. A Single Bent Strip is bolted to the upper Boiler End and a loop in the end of the Sprocket Chain is held in the Double Bent Strip by a Pivot Bolt and Nut. To prevent chain slip, a small counterweight is attached to the trailing end of the Sprocket Chain and this comprises a large Crane Hook passed through a Chain link, the Hook being bolted in a small Fork Piece on the end of a 3½" Axle Rod. Two spare Bevel Gears from the No. 10 Set are fixed to the Axle Rod and it is this end of the chain that is pulled to rewind the strike mechanism.

COMPOUND RATCHET WHEEL

This can be seen in the illustration and is formed from the pair of 2" Sprocket Wheels which are free to revolve on 4½" Rod 9. Two Collars are sandwiched between the Sprockets to act as spacers for the ¾" Bolt which clamps the Sprocket Wheels, and one end of a Tension Spring is secured by a Bolt to one of these Collars. The lower end of the Tension Spring is bolted to a third Collar on a Long Threaded Pin which passes through both Sprocket Wheels, the last Collar mentioned being adjusted to hold the squared shoulder of the Threaded Pin in contact with the Ratchet Wheel 12 which itself is fixed to Rod 9.

On the far side of the Sprockets, a Collar is fixed to hold the loose Sprockets lightly against the Ratchet Wheel. Rod 9 passes into the front lower clock plate but not through the rear plate. A stand-off bearing is provided by a 2½" Double Angle Strip, lugs inwards, spaced from the rear clock plate by the two Stepped Bent Strips 13. A ¾" Bolt secures the lower spacer and the upper one is trapped by a 2" Screwed Rod, two Nuts and a Rod Connector which acts as a stop pin for the bell striker 8.

GEAR TRAIN

A step-up drive from the Ratchet Wheel shaft 9 to the striking shaft is provided by two sets of 25t Pinions and 50t Gear Wheels, the upper of the two Pinions being clearly shown at 5. One 50t Gear is fixed to shaft 9 and drives the first 50t Gear immediately above it on a 2½" Rod. This same Rod carries the second 50t Gear Wheel alongside the Pinion and both Gears run just inside the front clock plate. The outer journal for the 2½" Rod is provided by a Reversed Angle Bracket secured by its longer lug to the back of the clock dial.

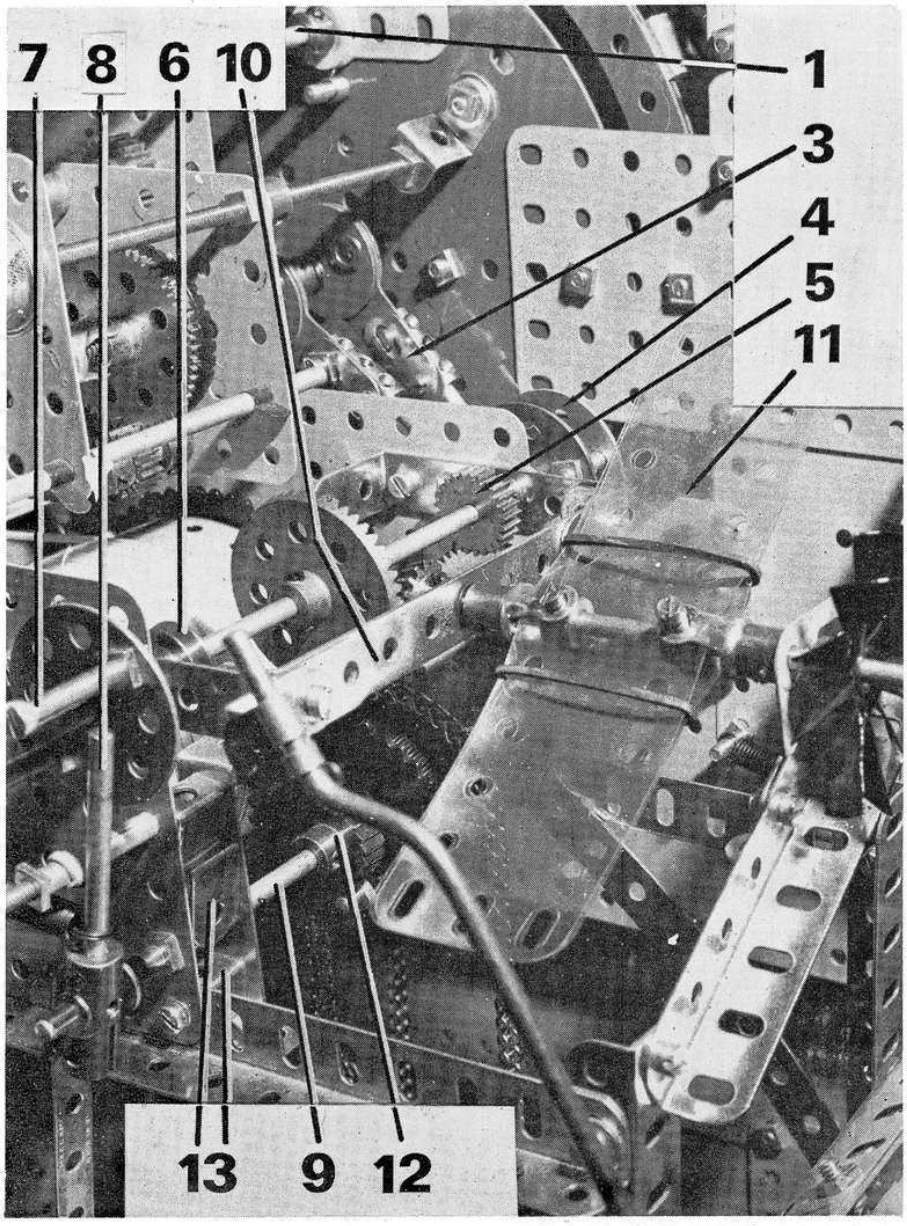
At this stage, the smooth running of this gear train should be tested with just a little weight in the Boiler, the strike shaft itself being a 6" Rod. If the arrangement was left like this, the strike would tend to be overdriven so it is governed for smooth action by a further step-up gearing to a fan acting as an air brake. A slight change from the original design has been adopted, as shown in the illustration, to provide a central journal for the fan shaft. A pair of 2½" x 1" Double Angle Strips support a 4½" x ½" Double Angle Strip 10 as shown. Eight holes up the sloping Angle Girder at the side of the clock, a Flat Trunnion is bolted on with one Bolt and sandwiched at the same time by a 2" Strip. This secures the Trunnion, but allows it to be set slightly downwards to line up with the fan shaft and to provide an outer journal. A pair of 5½" x 1½" Transparent Plates 11 make the fan, or air brake, and these are held in position by the two Small Fork pieces and Collars shown. Two small Driving bands secure the Plates in close proximity to prevent 'flapping'. The Meccano fan at the end of the shaft merely adds a little to the air brake effect.

An 8-hole Bush Wheel is fitted with a Threaded Pin and a ¾" Bolt 7, diametrically opposite, to form tripping pins for the strike lever 8. The strike lever itself is a 2" Rod fixed in a Slotted Coupling which is free to pivot on a Long Threaded Pin. Spring Clips and Washers locate the Coupling laterally. A 3" Narrow Strip is attached to the Coupling with a Bolt and lock-nut and its bottom hole is fitted with a Nut and Bolt to make a bell hammer. To provide a limited return motion to the striker arm, a Tension Spring is fitted to the strike lever rod and taken, via a Fishplate, to the rear of the clock's main winding shaft. Fig. 7 on page 64 of the October 1973 M.M.Q. shows this quite clearly. (The 2½" Triangular Plates shown in the original Fig. 7 now provide strengthening pieces at the junctions of the sloping Angle Girders where they meet the side of the clock dial framework.

The 6" strike shaft is passed through the rear clock plate and centre holes of the 2½" x 1" Double Angle Strips. It carries a ½" Pulley 6 acting simply as a Collar, a large Bevel Gear, meshing with the small one on the fan shaft, and Pinion 5, before going through the second Double Angle Strip and the front clock plate. On the far end of the shaft is mounted the release wheel made from two 6-hole Bush Wheels. The innermost of these carries a Threaded Pin which protrudes into one hole of the second Bush Wheel which, in turn, carries another Threaded Pin diametrically opposite, but this Pin protrudes forward into free space.

ECCENTRIC TIMING PUMPS

It now only remains to provide a timing mechanism for the release wheel and this is done in rather a novel fashion by making use of the two small Eccentrics in the No. 10 Set (What has happened to the two large Eccentrics in the No. 10 Set one might ask? – They are ignominiously hidden in the base of the clock in the lowly position of substitute Collars to hold on the front feet of the



Close-up view of the strike mechanism fitted to the Grandfather Clock which appeared in the October 1973 issue of the Meccano Magazine Quarterly.

clock!). To clarify the photograph and, incidentally, to reduce the bearing friction on the seconds hand shaft 1, the front upper clock plate has been stepped over three holes to the left (as viewed from the rear of the clock.)

Each small Eccentric is fitted with a Coupling which carries a 2" Rod and the Couplings and Rods are fixed by Shoulder Bolts or lock-nutted using Fishplates 3 to take up some of the slack. Just to the left of Pinion 5 a Bolt can be seen and this passes through the Double Angle Strip and front clock plate to hold a Threaded Boss in place. Into this Boss a 1-1/8" Bolt is screwed tightly to act as a slide bearing for the two 'pump' rods.

It will be noted that the Eccentrics are mounted on the minute shaft at a displacement of 180° and it is this setting which must be adjusted to permit the clock to make its single strike exactly on the hour and the half hour. The inner Eccentric releases the Bush Wheel Pin seen at 4, allowing the strike shaft to rotate through 180° before the Threaded Pin on the outer Bush Wheel is trapped by the other Eccentric Rod, and so on, alternate release and trap operating at each half hour period. The position of the Strike Wheel pins 7 must be set just right by adjusting the 8-hole Bush Wheel's Grub Screw so that a clean strike is obtained, the Boiler weights being adjusted at the same time. Free-running bearings and a minimum weight in the Boiler is the secret. Properly set up, the strike mechanism will match the clock run on a single wind.

DING-DING TRAMCAR

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lengths of rail taken from old tinplate track form the overhead rail as seen in Fig. 1 and these are held by their own pinching action on the lug of Double Angle Strips bolted to further Flanged Brackets at the top of the Girders.

An 8" Rod forms the trolley arm, the 'slipper' which contacts the overhead rail being a Slide Piece 39. End Bearings 40 form a flexible joint and pivot for the lower end of the trolley arm, while a short length of Spring Cord fitted with hooks gives tension to the trolley arm as shown in Fig. 1. A Cord Anchoring Spring is fitted to the trolley arm and another to the tip of a Long Threaded Pin 41 secured in the Insulating Plate 36 on the tram roof. One wire to the Motor is joined to the Pivot Bolt in the centre of the tram roof and the other wire of the motor goes to a convenient point on the tram chassis.

MECHANICAL SEQUENCING

Once the necessary 12 volt D.C. power supply is connected to the rails and to the overhead conductor, the motor will run and it will run continuously, regardless of what the tram is doing at any particular time. Drive to the rear wheels is fairly direct and at a nice scale speed, but Worm Gears meshing with Pinions are providing a slow drive to the two cam shafts. In fact there are two Worm reduction stages to the lower cam shaft which runs at the same speed as, and hence in phase with, the upper cam shaft. This is important. As the tram moves along, the lower Cam begins to push the short shaft to its right in a sideways direction, very slowly, eventually moving Gear 10 out of mesh, causing the tram to stop.

Just before this happens, the single Cam on the upper shaft must be set to trigger its bell for the single 'ding'. While the tram is at rest, the gear train to the cam shaft continues running. After a short pause, the second set of upper Cams gives a 'ding-ding' signal and almost immediately after this, the lower Cam has reached a position where it allows Gear 10 to spring back suddenly into mesh, thus giving the characteristic forward lurch of the old trams and driving the tram round the track until the bell sequence starts once again. Simple, but very effective, very realistic and very entertaining!

PARTS REQUIRED

6- 1a	2-18a	6- 48	1-125
4- 1b	4-20	4- 48a	4-131
14- 2	2-20b	1- 50	1-139
4- 3	3-23b	2- 51	1-139a
3- 4	2-25	1- 52	2-162a
2- 5	4-26	1- 58	2-166
6- 6a	3-27d	2- 58b	2-176
2- 8a	2-29	18- 59	6-179
1- 9d	2-30a	3- 63c	3-186a
4-12	2-32	2- 72	6-189
3-12a	182-37a	4- 90a	2-192
1-14	168-37b	4-103e	2-196
1-16a	36-38	5-111a	2-214
7-16b	1-46	1-115	8-215
2-17	1-47	1-115a	3-235b
1 Motor-with-Gearbox		1-120b	1-511

TRAMWAY STANDARD

1-5	9-37a	1- 48a	1-215
1-8	9-37b	2-139	1-501

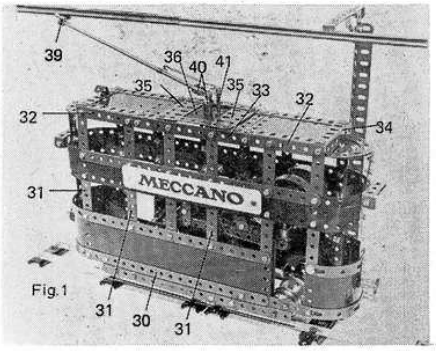

Fig.1