by **Spanner**

Build a Coin Machine

AT the flick of a switch, the model described here will whirl into action and supply builders with a little pile of money! Before you get excited, however, I should explain that it isn't some sort of magic box—it is simply a coin-giving machine which must, first, be loaded with a stock of pennies before it can deliver the 'goods'. Either threepennyworth or sixpennyworth is supplied, depending on the position of a wheel on the top of the model.

Framework

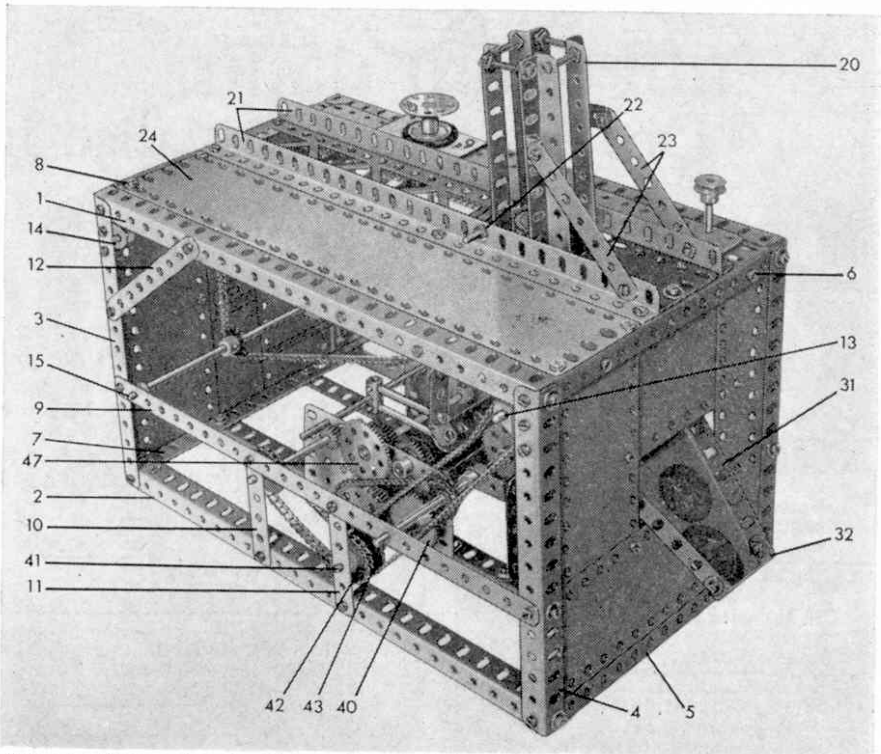
Two rectangles, each built up from two 12½ in. and two 7½ in. Angle Girders 1, 2, 3 and 4, are connected together by four 7½ in. Angle Girders 5, 6, 7 and 8. A 12½ in. Strip 9 is bolted to the upright Angle Girders and is supported by two 3 in. Strips 10 and 11. To hold the framework rigid, a 4½ in. Strip 12 is secured to Angle Girders 1 and 3. Three 8 in. Rods 13, 14 and 15, each carrying two ¾ in. Sprocket Wheels, are journalled in 1 in. Corner Brackets bolted to the Angle Girders, as shown. A 1 in. Sprocket Wheel 16 is also secured on Rod 13. Three-inch Strips are attached by paper clips in every fourteenth link of two Sprocket Chains, 168 links in length.

The Chain is then placed over the ¾ in. Sprocket Wheels on Rods 13, 14 and 15. Two 7½ in. Strips 17 and 18 are attached to the top 12½ in. Angle Girders with ½ in. Corner Angle Brackets. A 2½ in.×1½ in. Flanged Plate 19 is bolted to the Strips 17 and 18 three and a half inches from Angle Girder 1. The 3 in. Strips on the Chain must just clear the surface of this Plate.

Coin Magazine

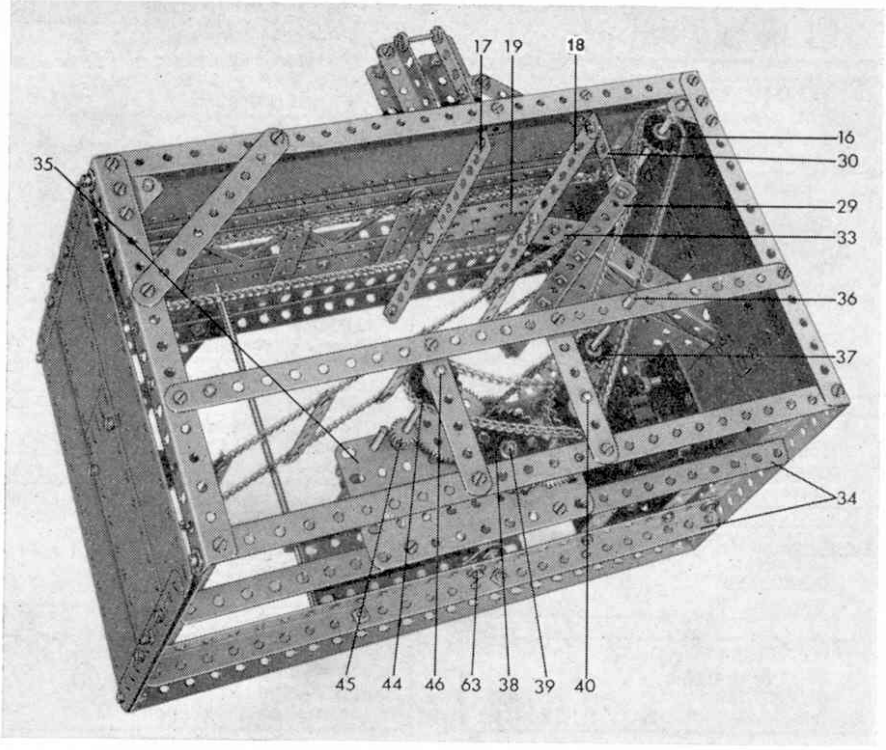
Four 4½ in. Angle Girders 20 are bolted together in pairs, using 1⅛ in. Bolts with three Nuts. The Nuts are adjusted so that a penny just clears the angle of the Girders. Two 12½ in. Angle Girders 21 are fixed to the Angle Girders 6 and 8 as shown, and the coin magazine is fastened to these by means of a 3 in. Screwed Rod 22 and two 3½ in. Strips 23, Angle Brackets being used at the magazine end.

The distance between the bottom of



This general view of the coin-giving machine clearly shows the coin magazine which the operator loads with pennies. These are delivered on request either three or six at a time.

This view of the machine shows the various sections of chain drive used in its construction



the 4½ in. Angle Girders and the 2½ in. ×1½ in. Flanged Plates should equal the thickness of a new penny. The top is covered by a 12½ in.×2½ in. Strip Plate 24, two 5½ in. ×1½ in. Flexible Plates 25, a 1½ in.×1½ in. Flat Plate 26, a 7½ in. Braced Girder 27 and two 2½ in.×1½ in. Flexible Plates 28, overlapped two holes.

Coin Tray

A 7½ in. Strip 29 is attached to the 7½ in. Strip 18 by means of a 1½ in. Strip 30 and an Obtuse Angle Bracket at each end. Two 5½ in. Angle Girders 31 are connected to each other by a 1½ in.×½ in. Double Angle Strip 32, and the bottom of the tray is filled in by a 5½ in.×1½ in. Flexible Plate and two 3½ in.×1½ in. Flexible Triangular Plates, the last-named being bolted to the 7½ in. Strip 29. Flexible Plates of various sizes enclose the space around the tray, as shown. A 1½ in. Flat Girder 33 is attached by Angle Brackets to the front of the Flanged Plate 19 to guide the coins on to the tray.

Motor Drive and Gear Box

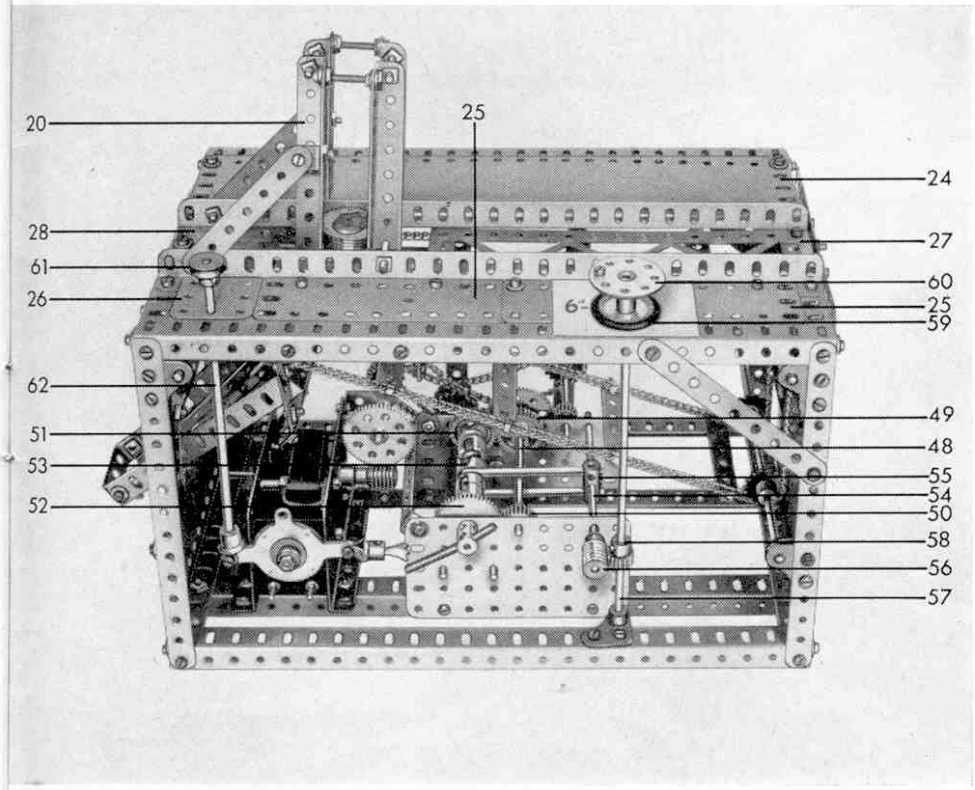
Two 12½ in. Angle Girders 34, each carrying a 4½ in.×2½ in. Flat Plate 35, are bolted to the Angle Girders 5 and 7. These serve as a base for the Motor. A Worm Wheel on the armature shaft of the Motor drives a 57-tooth Gear Wheel on a 4½ in. Rod 36 that carries a ¾ in. Sprocket Wheel 37. This Sprocket Wheel is connected by Chain to a 1½ in. Sprocket Wheel 38 which is secured to a 5 in. Rod 39 mounted in Flat Plates 35. Behind Sprocket Wheel 38 a ¾ in. Pinion engages with a 50-tooth Gear Wheel 40, mounted on an 8 in. Rod 41, which also carries two 1 in. Sprocket Wheels 42 and 43. Sprocket Wheel 43 drives Sprocket Wheel 16. A 1 in. Sprocket Wheel 44 and a ½ in. Pinion 45 is fixed on a 3½ in. Rod 46. Sprocket Wheels 42 and 44 are now connected by Chain. A 57-tooth Gear Wheel 47 on a 4 in. Rod 48 engages with the Pinion 45. Also secured to Rod 48 is a 1 in. Gear Wheel 49 and a ¾ in. Pinion 50.

A Socket Coupling carrying the female part of a Dog Clutch is attached to the boss of another 1 in. Gear Wheel 51, then a similar arrangement, using a 50-tooth Gear Wheel 52 in place of the 1 in. Gear, is built up. Both are mounted loosely on a 4 in. Rod with keyway, making sure that they are free to turn. Between the Socket Couplings is placed another Socket Coupling 53 carrying two male parts of a Dog Clutch, one of the Dog Clutches being fitted with a Key Bolt. The Dog Clutches are so placed that when the Motor start lever has been knocked off (as explained later) the Socket Coupling 53 can be moved to engage with either of the other two Socket Couplings. On a 5 in. Rod 54 is mounted a Coupling 55 supporting two 3 in. Rods which engage with Socket Coupling 53, and a worm 56. On an 8 in. Rod 57, mounted as shown, a ½ in. Pinion 58 that engages with the Worm, is fixed, while a 1 in. Pulley with Rubber Ring 59 acts as a brake when the Rod is turned by means of an eight-hole Bush Wheel 60, to give the particular amount of change required.

The Motor is started by depressing the ½ in. Pulley 61 on a 6½ in. Rod 62 which is connected to the starting lever by an End Bearing, lock-nutted in position. Rigidly fixed to the other arm of the starting lever is another End Bearing supporting a Centre Fork. On the end of the Rod with keyway is placed a Short Coupling in which a Flexible Coupling Unit is mounted. When the Motor is started, this Flexible Coupling Unit revolves until it hits the Centre Fork, thus switching off the Motor.

By adjusting the length of the Flexible Coupling Unit and the angle of slope of the Centre Fork, the Motor can be made to stop when one of the 3 in. Strips on the endless chain is under the 4½ in. Angle Girders 20.

The Socket Coupling arrangements 51 and 52 are held in position by placing 1 in. Rods in Rod Sockets secured to Fishplates fixed to the Angle Girders 34 by Bolts 63. The ends of the 1 in. Rods fit into the centre grooves of the Socket Couplings.



Parts required :—1 of No. 1; 3 of No. 1b; 2 of No. 2; 2 of No. 2a; 4 of No. 3; 15 of No. 4; 2 of No. 6a; 2 of No. 10; 2 of No. 12; 1 of No. 12a; 4 of No. 12c; 4 of No. 13a; 2 of No. 14; 2 of No. 15; 1 of No. 15a; 1 of No. 15b; 1 of No. 16; 2 of No. 16a; 2 of No. 18b; 1 of No. 22; 1 of No. 23a; 1 of No. 24; 2 of No. 25; 2 of No. 26; 2 of No. 27; 2 of No. 27a; 2 of No. 31; 2 of No. 32; 151 of No. 37a; 120 of No. 37b; 54 of No. 38; 1 of No. 48; 1 of No. 48b; 1 of No. 51; 2 of No. 53a; 13 of No. 59; 1 of No. 63; 1 of No. 63d; 1 of No. 65; 1 of No. 74; 1 of No. 80c; 2 of No. 94; 1 of No. 95a; 4 of No. 96; 7 of No. 96a; 1 of No. 99b; 1 of No. 103h; 4 of No. 111c; 8 of No. 111d; 2 of No. 133a; 2 of No. 144; 2 of No. 154a; 2 of No. 154b; 2 of No. 166; 3 of No. 171; 1 of No. 175; 2 of No. 179; 2 of No. 188; 4 of No. 189; 1 of No. 190a; 2 of No. 191; 1 of No. 192; 3 of No. 195; 1 of No. 197; 2 of No. 224; 1 of No. 230; 1 of No. 231; 1 E15R Electric Motor; 24 Paper Clips.

The particular amount required from the machine is decided by the selector wheel, shown in this view at figure 60. The 6d position is on the left of the white card surrounding the wheel. The 3d position is hidden by the wheel itself

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OPERATING BY TIMETABLE

by **Linesman**

IN several of my articles recently, I have mentioned that the operation of a timetable, in which the timing of train movements and schedules is precise, can make exciting demands on the skill of the operator, and will also add great interest to the average model railway. This month, I want to explain the various processes involved in compiling a working timetable suitable for an end-to-end layout having a set of hidden storage sidings. This differs from a normal railway timetable by including *all* train and shunting movements in any particular station, rather than presenting a record based purely on passenger train movements between one station and another.

One advantage of the end-to-end layout is that a train can leave the terminal station at the time indicated on the timetable and eventually disappear into a tunnel containing a number of storage sidings. These sidings can be used to represent the remainder of a journey, so that it is possible for you to draw up a fairly comprehensive timetable; in fact, you could have trains leaving for most points in the British Isles!

This system has been adopted by Mr. E. C. Parker of Maghull, near Liverpool, whose layout is illustrated in our photographs. Mr. Parker uses Hornby-Dublo locomotives —he has about 20 in all—and rolling stock and, as you can see, believes in the effective use of well-planned backgrounds. Perhaps at a later date I may have the chance to describe his layout more fully.

Remember that timetables cannot be drawn up haphazardly; in fact, you will invariably find that a great deal of careful thought will have to go into their compilation. Train services to and from the main terminal station should be planned so that they interlock. If, for instance, the railway you intend building is of a single branch line nature, it is obviously impossible to have one train leaving the terminus and another entering at the same time. The timetable must also allow for a specific number of trains in the storage sidings at any one time. Gaps must be left in the schedule to allow shunting operations to be carried out in the terminus, and also to give a second operator a breathing space to turn trains round in the storage sidings.

Before describing the timetable for the layout shown in Fig. 2 let me first describe the six different types of train to be used for the timetable I have compiled. The express passenger train can be formed from five, or possibly six, coaches of the following types, No. 4075 Passenger Brake Van B.R., No. 4053 Corridor Coach Brake/2nd, No. 4063 Open Coach 2nd Class B.R., No. 4052 Corridor Coach 1st/2nd B.R. and No. 4062 Open Coach 1st class B.R. The local passenger train can be formed from two or three coaches of the suburban types available from the Hornby-Dublo range. Coaches Nos. 4081, 4082, 4083, and 4084, are quite suitable. The push-pull train should consist of one coach, preferably either 4082 Suburban Coach Brake 2nd S.R., or No. 4084 Suburban Coach Brake/2nd B.R.

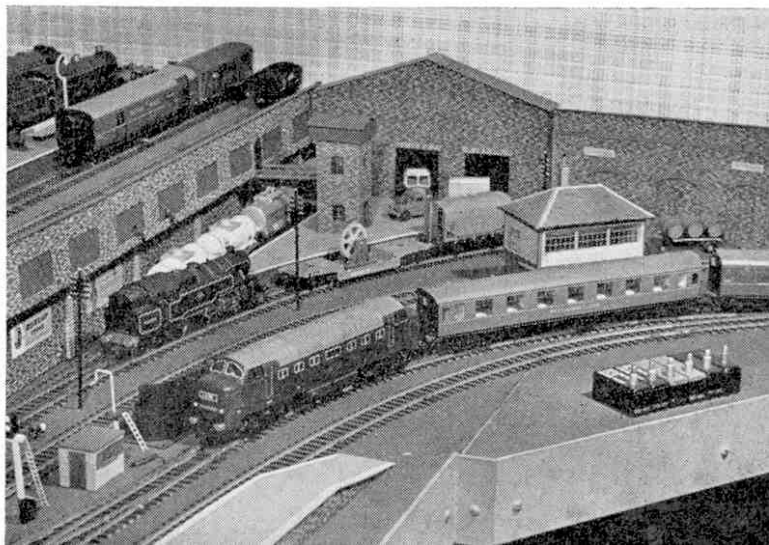
Most important train

Turning now to the goods traffic on the line, the most important train is the express goods. This should have a Brake Van—either No. 4311 or No. 4310, and a variety of wagons and vans of your own choice. Most of the goods vehicles in the Hornby-Dublo range are suitable. The only parcels train to travel on the branch can be formed from No. 4325, 12-ton Ventilated Van, and also a number of No. 4323 Four-Wheeled Utility Vans. A small number of goods wagons of No. 4640 Goods Wagon Steel Type can also be used, as can any of the three Hornby-Dublo Brake Vans. The remaining train is the pick-up-goods which, of course, can use any of the goods vehicles in the Hornby-Dublo range.

You will see from both the working timetable for the terminus, and also the train movement and engine link list, that each locomotive has its own special code number.

I would suggest that you divide the locomotives into two types—passenger and goods. The passenger locomotives are prefixed with a 'P', and the goods with a 'G'. Each locomotive is then given a number. For my layout, I

Working strictly to timetable, the early-morning express on the layout of Mr. E. C. Parker of Maghull, near Liverpool, is seen here entering the through station. It is hauled by a Hornby-Dublo Co-Co Diesel Electric Locomotive. Scenery has been put to excellent use on this two-level, end-to-end layout on which train running is meticulously timed.



Mr. Parker operating the comprehensive control panel

decided to use No. 2226 'City of London', No. 2218, 2-6-4T, No. 2217, 0-6-2T, and No. 2224 2-8-0. The passenger coaches should then be sorted into rakes or trains, and listed accordingly.

The first step when compiling a timetable is to make a sketch of the layout concerned (similar to that shown in Fig. 2). You will notice that every terminal line and siding has been given a separate number. This serves two purposes; the first is to act as a guide when compiling the train movements and engine link list, and the second to enable a specific destination to be given to each train. You will notice, on the working timetable for the terminus, that each train movement has a number after it. This number refers to the line from which the train is to depart, or on which it will arrive.

Major train movements

When the plan has been drawn, and numbers allotted for each road, a graph must be drawn (as in Fig. 1) showing each major train movement between stations. The abbreviations used on the graph are as follows: 'T' for terminus, 'TH' for through station, and 'S' for storage sidings. The abbreviations used for the trains themselves are: P-P—push-pull train, EG—Express Goods, LP—Local Passenger, EP—Express Passenger, PUG—Pick-Up Goods, P—Parcels.

When plotting trains on the graph, you must be careful to ensure that only three trains in succession arrive at the terminus, or alternatively depart for the sidings. Your layout may, of course, have more storage sidings, in which case you can increase the number of trains arriving at the terminus, if the platform and siding accommodation is

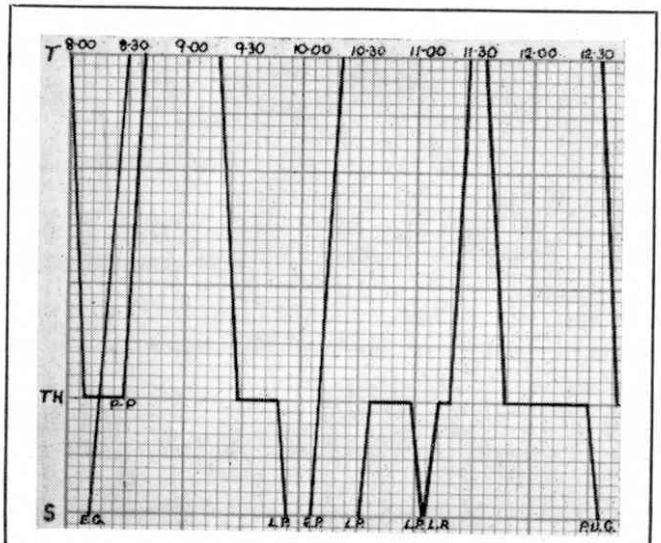


Fig. 1 Part of the graph showing several of the train services. As the article explains, it is possible to draw up the movements sheet from information given on this graph

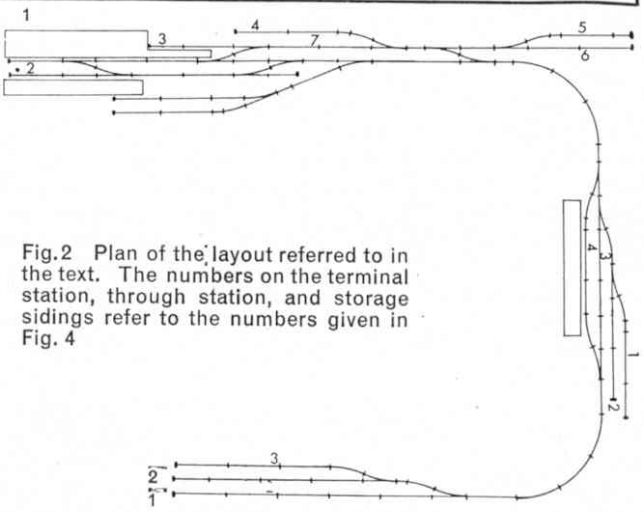


Fig. 2 Plan of the layout referred to in the text. The numbers on the terminal station, through station, and storage sidings refer to the numbers given in Fig. 4

also enlarged. Sufficient time should also be allowed for shunting operations in the goods yard.

I may appear to be stating the obvious, but do remember that the successful operation of a timetable hinges on one factor—time. Because the distances between stations on a model railway are not in proportion to full-size practice, the time taken for a train to travel between stations will also be much less, and this must be compensated for your

Time	*Train*	*Locomotive*	*Movement*
8.00	Push-pull train to through station	(P1)	Terminus 3, to through station 4
8.12	Express goods to terminus	(G1)	Storage sidings 1 to terminus 1. Shunt to 5
8.29	Push-pull to terminus	(P1)	Through station 4 to terminus 3
9.18	Local passenger to storage sidings	(P2)	Terminus 2 to siding 1
10.06	Express passenger to terminus	(P3)	Storage sidings 2 to terminus 2
10.30	Local passenger to through station	(P2)	Storage sidings 1 to through 4
10.57	Local passenger to sidings	(P2)	Through station 4 to sidings 1
11.06	Local passenger to terminus	(P2)	Sidings 1 to terminus 1
11.36	Pick-up goods to through station	(G1)	Terminus 5 to 7, to through station 4
12.30	Pick-up goods to sidings	(G1)	Through station 3 to sidings 2
12.36	Push-pull to through station	(P1)	Terminus 3 to through station 4
1.06	Push-pull to terminus	(P1)	Through station 4 to terminus 3
1.42	Express passenger to storage sidings	(P3)	Terminus 2 to sidings 1

Fig. 3 Part of a train movements and engine link list.

timetable. One method of doing this is to change the gear ratios of an old clock sited near the layout, to give a proportion of 3 or 4:1. A better system, in my opinion, is to plot trains in the normal way, using their scheduled times, and then to use the actual time taken for the model to travel from one station to another. You will thus have two columns on the final working timetable, and you will see in Fig. 4 that both the actual time and the scheduled time are entered in the timetable.

To make the scheduled times look realistic, the stations should be shown in the graph as being a suitable distance apart. You will see from the graph that the through station is three miles from the terminal station, and the storage sidings are placed at one-mile distance from the through station. Trains should be in exactly the same positions at the beginning and end of the timetable, so that another operating session can begin without the need to position items of rolling stock and locomotives.

When the graph is complete, a 'train movements and engine link list', similar to the one I have compiled in Fig. 3, should be drawn up. This is done by reading through each train-working on the graph and plotting it on the 'train movements and engine link list', listing the train positions on each siding and platform road. To assist with the latter job I would suggest you compile a list similar to that shown in Fig. 5. This will help to prevent any two trains occupying the same siding or platform road at the same time. The times of trains arriving and departing at any particular point should be marked down.

Finally, the working timetable for each station can be drawn up. I have shown in Fig. 4 part of the working timetable for the terminus of the layout shown in Fig. 2, and you will see that this includes all train and shunting movements in and out of the station. A normal timetable may then be compiled, but as this is of no material use for operating the layout, I have not included it in my diagrams. It can be useful, however, when visitors are viewing the layout, and those of you who wish to include it will find it is quite simple to compile using the times indicated on the working timetables for the various stations.

The West Country afternoon express leaves the main terminus on Mr. Parker's layout. It is headed by a Hornby-Dublo 'Barnstaple' loco and has a train made up of Pullman Coaches

Let us then follow the early morning train movements for the terminus. At 8 a.m. (actual time 0 min.) a push-pull train from platform 3 is despatched to the through station, carrying workmen to their places of employment. The points and signals will then be set to receive at 8.30 (actual time 5 min.), the express goods on platform 1. The goods locomotive will then push the train into siding 5 at the right hand end of the station to allow the platform to be used for another train. At 8.37 (actual time 7½ min.) the push-pull returns from the through station into platform 3. At 8.40 (actual time 8 min.) the goods locomotive sorts and marshalls the train that will eventually become the 11.36 pick-up goods. When completely marshalled, the train is shunted into siding 4, where it will wait until its turn of duty arrives.

From this example of a working timetable for an end-to-end layout you will see how interest in model railway working can be heightened.

Working Timetable for Terminus

Actual time	*Scheduled*	*Loco-motive*	*Movement*
0 min.	8.00	P1	Despatch push-pull from platform 3 to through stn.
5 ,,	8.30	G1	Receive express goods on plat. 1
6 ,,	8.35	G1	Shunt goods into the siding 5
7½ ,,	8.37	P1	Receive push-pull from through stn. into plat. 3
8 ,,	8.40	G1	Marshall pick-up goods into siding 4
12 ,,	9.18	P2	Despatch local passenger from plat. 2 to storage sidings
16 ,,	10.16	P3	Receive express passenger into plat. 2
26 ,,	11.27	P2	Receive local passenger into plat. 1
28 ,,	11.36	G1	Despatch pick-up goods from siding 4 to through stn.
32 ,,	12.36	P1	Despatch push-pull from plat. 3 to through stn.
35 ,,	1.15	P1	Receive push-pull into plat. 3 from through stn.
35½ ,,	1.42	P3	Despatch express passenger from plat. 2 to storage sidings
37 ,,	2.43	G1	Receive parcels into siding 4
38 ,,	2.50	G1	Shunt and sort parcels train in sidings 5 and 6
42 ,,	3.10	G1	Shunt train into siding 7
44 ,,	3.24	G1	Despatch express goods from siding 7 to storage sidings
46 ,,	3.36	P2	Despatch local passenger from plat. 1 to storage siding
48 ,,	4.30	P1	Despatch push-pull to through stn.
50 ,,	5.03	P1	Receive push-pull plat. 3 from through stn.

Fig. 4 The final working timetable for the terminus station. Similar working tables can be drawn up for the through station and storage sidings.

Terminus Occupation List

1	2	3	4	5	6	7
8.12*	9.18*	8.00*		8.12*	2.06*	11.36*
11.06*	10.06*	8.29*		11.36*	6.30*	2.06*
3.36*	1.42*	12.36*		2.06*		3.24*
5.30	5.00	1.06*		6.30*		6.30*
		4.30*				8.00*
		5.48*				
		6.18				

Fig. 5 The terminus occupation list. The numbers at the top of each column refer to the various sidings and platforms in the terminus. The figures listed below each number indicate times at which the trains arrive and depart. Once a siding or platform has been vacated, the time at which the train arrived and left can be struck out, or marked with an asterisk as shown.