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Deadline for July issue is 19 June 1988.
NEXT MEETING: Friday, 15 July 1988.
VENUE: A.R.H.S. Library Room, Windsor Rly Station.

MINUTES OF MARCH 1988 MEETING

HELD AT: A.R.H.S. Library Room, Windsor Railway Station.

HELD ON: Friday, 18 March 1988.

MEETING COMMENCED: at 2036 hours following the Annual Meeting.

PRESENT: Jack McLean, Stephen McLean, Jim Brough, Wilfrid Brook, Jon Churchward, Roger Jeffries, Alan Jungwirth, Tony Kociuba, Keith Lambert, Colin Rutledge, John Sinnatt and Andrew Waugh.

APOLOGY: David Langley.

MINUTES OF PREVIOUS MEETING: adopted as read (Kociuba/Rutledge)

BUSINESS ARISING: Nil

CORRESPONDENCE: Nil

ITEMS OF INFORMATION & DISCUSSION:

1. VIOLET TOWN has a closing lever but does not switch out. What stops the lever being used at the wrong time? Nothing. Is there a composite staff exchange box? No. (The discussion assumed that the closing lever would enable the station to be unattended more often.)

2. BEAUFORT was 100 years old last Saturday. Everything but the platform and stock siding is listed for removal.

3. Graeme Reynolds has visited Jack McLean. They are to try an compile a list of the dates of intriduction of staff and ticket on all lines (and which sections had Winter's Block).

4. Role of Train Control (and the need for it now that many lines have only a few trains).

5. Advantages and disadvabtages of electric staff and tablet (compared with each other).

6. Likelihood of one-man trains in the suburban area.

7. Tail discs and more modern equivalents.

8. Nothing left at Craigieburn but platforms and the goods siding removed at Donnybrook.

9. SRS (UK) has reviewed "Cross Country". One comment was that the diagrams did not include lever numbers. We seek these details for Linton Junction, Newtown, Cressy and Irrewarra.

MEETING CLOSED: at 2208 hours.

NEXT MEETING: Friday, 20 May 1988 at Windsor Railway Station.

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SIGNALLING ALTERATIONS

2.11.1987 TOCUMWAL. The road/rail bridge was closed to road traffic following the opening of the new road bridge over the Murray River.

17.1.1988 BELL. Signal posts Nos 11 and 11C were relocated 1.5 metes further out from the track. (O 2014/88)

20.12.1987 GARDENVALE. Automatic signal B369 was removed from the overhead structure and placed on a ground mast. The signal lights were reverse staggered.

21.1.1988 BALLARAT 'A' BOX. The top disc on post 17, lever 80, was altered to apply from No 5 track to "D". The bottom disc, lever 9, was altered to apply from No 5 road to the Up Passenger Line. Amend diagram No 8'80.

22.1.1988 THOMASTOWN. The annett locked points and rodded derail at the down end of the siding were abolished. A baulk was placed across the siding at the down end. (O 2021/88)

24.1.1988 BRIGHTON BEACH. Automatic signal BBH908 will be renewed and converted to a light signal. (O 2019/88)

WN 5/1988 NORTH SHORE. A Hayes derail has been installed on the up side of the North Shore leve crossing on the lead to the Phosphate Sidings.

WN 6/1988 BAXTER. The composite staff exchange box will be used for the under mentioned trains.

Days	Train No	Portion of Composite Staff
MONDAYS	9521	Ticket B and Staff.
	8518	Full Staff
	8521	Full Staff.
	9345	Ticket A
	8522	Ticket B and Staff
	8525	Ticket A
TUESDAYS-THURSDAYS	9334	Ticket B and Staff
	8518	Full Staff
	8521	Full Staff
	9345	Ticket A
	8522	Ticket B and Staff
	8525	Ticket A
FRIDAYS	9334	Ticket B and Staff
	8518	Full Staff
	8521	Full Staff
	9345	Ticket A
	8522	Ticket B and Staff
	8525	Full Staff
	8530	Full Staff
	8529	Ticket A
SATURDAYS	9334	Ticket B and Staff
	9117	Ticket A
	8500	Ticket B and Staff
	8501	Full Staff
	8502	Full Staff
	8503	Full Staff
	8504	Full Staff
	8505	Ticket A
	9529	Ticket B and Staff
	8506	Full Staff
	8507	Full Staff
	8508	Full Staff
	8509	Full Staff
	9530	Ticket A
	8510	Ticket B and Staff
	8511	Full Staff
SUNDAYS	8500	Full Staff
	8501	Full Staff
	8502	Full Staff
	8503	Full Staff
	8506	Full Staff
	8507	Full Staff
	8508	Full Staff
	8509	Ticket A

31.1.1988 ARARAT CONTROL. The control room was closed and transferred to Transport House.

3.2.1988 EAST RICHMOND-EAST CAMBERWELL. New signalling diagram No 61'87 will become effective and diagram No 15'81 is cancelled. Automatic signals ERM304 and ERM373 were converted to home signals. (O 2056/88)

7.2.1988 EAST MALVERN-JORDANVILLE. The up line was slued to a new alignment. (O 2062/88)

8.2.1988 SUNSHINE. No 16 points and Sidings "C" were abolished. Levers Nos 7, 15, 16 and 27 were sleeved normal. (O 2061/88)

11.2.1988 ST. JAMES. The Up and Down Home signals and plunger locking were abolished. No 1 road was abolished. (O 51/88)

16.2.1988 SUNBURY. The down end hand operated crossover between the centre road and the up line was provided with a "C" pattern annett lock and small point lever. A duplicate lock was provided on lever 6 which controls the up home signal. (O 70/88)

16.2.1988 DROUIN was closed as a switching block post. All signals were extinguished and covered, all points were spiked normal and will be removed later, and the interlocking frame was placed out of use. (O 79/88)

WN 6/1988 ASPENDALE - Block Hours. Mondays-Fridays switched in 0715-0750 and 1725-1815 hours. (O 2050/88)

WN 6/1988 SEAFORD - Block Hours. Mondays-Fridays switched in 0645-0705 and 1810-1830 hours. (O 2050/88)

WN 7/1988 BIRCHIP. A Notice Board lettered "STOPPING TRAINS MUST NOT PASS THIS POINT UNLESS ADVISED BY THE SIGNALMAN" has been provided at the up end of Birchip Loop. Commencing forthwith, the following instructions will apply to the working of trains through Birchip:-
1. The up home signal must not be cleared unless the down home signal is at Stop and the line through the loop is clear to post 1.
2. After the up home signal has been cleared, no movement is permitted to foul the up line as far as post 1.
3. After the signalman has cleared the up home signal, he must proceed to the notice board and display a red hand signal until the up train has come to a stand.
4. Up Stopping Passenger Trains - provided the necessary authority for the section Birchip-Watchem is available, the signalman may display a green hand signal from the platform to permit the train to pass the notice board.
5. Up Passenger Train Crossing a Down Train - when an up train requires to cross a down train, the up passenger train must be held at the up home signal until the down train is clear in the down loop road having performed its platform work. Only then may the up train be permitted to enter the Loop and approach the station.
6. Staff Exchange Box - must not be used for up trains unless specially authorised by the Superintendent of Safeworking. (O 65/88)

19.2.1988 DANDENONG-LANG LANG. The conversion of the Dandenong-Cranbourne- Koo Wee Rup-Lang Lang sections into one section of Staff & Ticket will take place after the passage of 8433 Down Leongatha passenger train on Fridays. The following trains will operate on the "long" section:-

Days	Train	Staff or Ticket
FRIDAYS	9491 Down Sand Gds	Ticket
	9490 Down Gds	Staff
	9290 Up Gds	Staff
	9480 ?	Staff
SATURDAYS	8408 Up Pass	Staff
	8409 Down Pass	Staff
	9484 Up Sand Gds	Ticket
	8434 Up Pass	Staff
	9487 Down Sand Gds	Ticket
	8433 Down Pass	Staff
SUNDAYS	9486 Up Sand Gds	Ticket
	8488 Up Pass	Staff
	9489 Down Sand Gds	Ticket
	8493 Down Pass	Ticket

This supersedes circular O 53/88. (O 75/88)

15.2.1988 EAGLEHAWK-INGLEWOOD. The electric staff sections Eaglehawk-Bridgewater-Inglewood were abolished and replaced by the Train Staff and Ticket system. The composite staff exchange boxes at Bridgewater and Inglewood were abolished. A Master Key was provided at Eaglehawk for the section Eaglehawk-Bridgewater.
(O 74/88)

18.2.1988 COPE COPE. The hinged derails on the up and down ends of the siding were replaced by catch points. (O 80/88)

WN 7/1988 SIGNALLING DIAGRAMS. The following signalling diagrams have been reissued but the reason for their reissue is a complete mystery.

Title of Diagram	New diag.	Old diag.
Glenhuntly-Mordialloc	63'87	
Kensington-Essendon	49'87	39'86
Footscray-Spotswood	9'87	14'76
South Kensington	35'87	4'83
Aspendale-Frankston	45'87	44'83
Jolimont-Merri	57'87	51'87

A new diagram for the section Glenbervie-Somerton No 43'87 replacing diagram No 3'86 was announced but the diagram did not appear in this issue of the Weekly Notice.

WN 7/1988 SOMERTON. A new dual gauge siding for the Blue Circle Cement Co. was provided. The sidings lead off the Steel Mains Siding and become

dual gauge before running parallel to the standard gauge line to the Cement Siding area on the north side of Patullos Lane. There are two roads at the unloading area, the right hand road is the loading/unloading road and the left hand road is the Loco Release road. The dead end extension of the loop holds 13 bogie cement wagons. (O 76/88)

WN 7/1988 BIRCHIP. Level crossing predictors have been installed on the crossing at Berriwillock Road and Sea Lake Road. Distinctive approach warning boards as shown below are erected at the start of the down approaches to the crossings. Shunting trains will work normally. (O 64/88)

21.2.1988 EASTMALVERN-JORDANVILLE. The down line was slued to a new alignment between MP 14.000 and MP 15.000. A pedestrian crossing at MP 14 + 771 metres (and I thought the Met were progressive) was brought into service. The crossing is equipped with bells and rotating red lights. (O 2074/88 & O 2079/88)

28.2.1988 SOUTH KENSINGTON-WEST FOOTSCRAY. Points 159 and 151D were abolished. Compound points 147D and 151U were separated to become simple turnouts. (O 115/88)

29.2.1988 CRAIGIEBURN was closed as a double line block post. All signals, points and the interlocking frame were abolished. (O 110/88)

29.2.1988 WARRNAMBOOL LINE. All passenger trains travelling between Melbourne and Warrnambool will be crewed by a two man locomotive crew and a conductor, a Passenger Guard will not be rostered. The passenger trains will operate under the same rules as two man Freight Trains. All safeworking duties previously performed by the Passenger Guard will now be performed by the Second Man and he will not be required to fill out a Guards Statement of Running (TR 27 & 2390).
When platform work has been completed, the Conductor will advise the loco driver by the End to End Radio as per the amended Rules and Regulations, and General Instructions, which will be issued shortly.

2.3.1988 VIOLET TOWN. The following alterations were carried out:-
1. The Cowslip Road boom barrier controls were converted to automatic operation for the main line (No 2 road), operation for the platform road will remain manual.
2. A closing lever, No 22, was provided. This lever is in effect a Guard's Lever and although it cannot be placed fully reverse without the signals in both directions being at Proceed, its function is to transfer control of Post 7 from the mechanical lever to the 5P key switch. The signal will then revert to the Stop position even though lever 5 is reverse. This enables a train on the staff exchange box to arrive without activating the boom barriers.
3. The down home signal on post 7 was replaced by light signal and when the closing lever has been operated this light signal must be cleared by the operation of the 5R key switch located in the Staff Exchange Box cabinet after the staffs have been exchanged.
4. The Staff Exchange Box is located near Post 7 on the down side of No 2 road. (O 114/88)

7.3.1988 YARRAWONGA. The up home arrival signal was converted to a light signal. The signal is controlled from the quadrant lever situated on the platform and the signal is repeated adjacent to the lever. (O 121/88)

7.3.1988 KILMORE EAST. The Goods Shed siding was abolished. The arm on post 7 and the disc on post 8 were removed. No 5 crossover was abolished and levers Nos 5 and 9 were sleeved normal. Lever 18 became a pilot lever. Amend diagram No 40'86. (O 144/88)

9.3.1988 SEYMOUR 'A' BOX. Siding D was abolished. No 13D points were removed, and a motor operated derail and wheel crowder provided inlieu. Post 5 was abolished and disc signals worked by levers 36 and 40 were removed from posts 6, 7 and 10. Levers Nos 18, 19, 35, 36 and 40 were sleeved normal. Amend diagram No 8'87. (O 143/88)

9.3.1988 CURYO. The hinged derails at each end of the siding were replaced by rodded catch points. (O 159/88)

9.3.1988 FRANKSTON. The following alterations were carried out:-
* - F1359 was altered to display a Reduce to Medium speed aspect whilst an up train is departing from the platforms.
* - Down Home signal No0 71 will display a Medium Speed Warning aspect when cleared towards No 1 road but will continue to display a Low Speed Warning when cleared towards No 2 road, or to No 1 road under certain failure conditions.
* - The boom barrier timing controls were also improved. (O 2099/88)

9.3.1988 NARRE WARREN. No 2 road was abolished. (O 2101/88)

10.3.1988 MORDIALLOC-ASPENDALE. Down automatic signal F916 was renewed insitu and the lights were altered to reverse stagger. (O 2104/88)

11.3.1988 EUROA. No 4 lock bar was abolished and replaced by a plunger and a track controlled electric lever lock. (O 151/88)

11.3.1988 NARRE WARREN. The signal box was 'permanently' switched out and is unavailable for further use. Signals U2, U3, 15 and 18 were fixed at Stop, and levers 15 and 18 were sleeved normal. Points 5, 7 and 11 were spiked normal and will be removed later, their operating levers also being sleeved normal. Signallevers 1, 2, 3, 14, 17 and 19, and closing lever 13 were sleeved reverse. (O 2105/88)

15.3.1988 DONNYBROOK. Siding "A" was abolished. Crossover No 6 and the annett lock on lever 5 were abolished. Levers 5 and 6 were sleeved normal. (O 165/88)

16.3.1988 OFFICER. The goods siding was abolished and the points spiked normal, the derail being spiked reverse. (O 2106/88)

17.3.1988 BALLAN. Signal No 30 was renewed in situ. (O xxx/88)

21.3.1988 MACORNA. The up and down end staff locked points and rodded derails were abolished. No 2 road was removed. (O 192/88)

WN 12/1988 SHEPPARTON-TALLYGAROOPNA. Signalling diagram No 6'88 became effective and diagram No 25'82 is cancelled. (O 184/88)

WN 12/1988 ARDEER-ROCKBANK. Signalling diagram No 8'88 became effective and diagram No 6'76 is cancelled. (O 185/88)

* 23.3.1988 WARRNAMBOOL. The motor points and associated signalling at the up end was abolished. (O 197/88)

* 28.3.1988 BROADFORD. The goods siding was abolished. The signals on posts 12, 14 and 15 were removed and levers 4, 6, 8, 9, 12 and 14 were spiked normal. Levers Nos 13 and 16 became Pilot levers. (O 199/88)

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BOOK REVIEW

TRAGEDY ON THE TRACK, TANGIWAI & OTHER NEW ZEALAND RAILWAY ACCIDENTS

by Geoff Conly and Graham Stewart.
192 pages, soft covered, RRP $29.95.

This book, published in 1986 by Grantham House, looks primarily from the general public perception at railway accidents in New Zealand during the steam era. It is not of the type of book such as Rolt's "Red for Danger" or Shaw's "A History of Railroad Accidents, Safety Precautions and Operating Practices" which give the background to the development of railway safeworking practices in the UK and the USA respectively.

From reading the book, New Zealand's perchance for natural disasters and resulting accidents is very high. Quite a number are described. The worst was the Tangiwai Bridge washaway in 1953 when 151 people lost their lives. Another problem was excessive speed by steam engines; few engines were fitted with speed recorders prior to 1950.

There were a number of safeworking failures but these are only generally described with little explanation on the real reasons why such failures occurred other than the superficial ones. Little explanation is given of safeworking systems. It requires a general knowledge of them to read and understand the book.

One classic case of equipment failure is reported. A semaphore home signal at Kaukapakapa did not return to the stop position when the lever was returned, due to ballast jamming the signal wire in pipe. A fatal head on collision occurred in December 1952 but it was not until September 1954 that the reason was found, after a number of reports of the signal not returning properly.

While the presentation and printing is good, there are, however, other defects in the book. There is no map and metric figures have been used with the imperial ones shown in brackets, but often incorrectly converted.

Generally readable but most certainly not the definitive book on railway accidents in New Zealand. (W.A.Doubleday)

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INTERLOCKING ON THE V.R. - ROCKER LOCKING FRAMES (PART 2)

McKENZIE and HOLLAND'S CAM and SOLDIER INTERLOCKING FRAMES
(Nos 5, 5a, 6 & 6a pattern frames)
by Colin Rutledge.

DESCRIPTION OF THE LOCKING

[C] Multiple Locks and Releases (continued). If there was no need for multiple locks and releases, then all connections between soldiers and lock rods would use a 5/8" dia. pin secured by a cotter.

When more than one soldier operates a lock rod, soldiers with an inbuilt pin are used. To prevent the lock rods disengaging the soldiers, a washer and cotter are provided on the end of the pin. It is not necessary to have a washer and cotter on every soldier on given lock rod. Beacuse lock rods are not very flexible, washered soldiers are fitted to soldiers on every third or fourth shaft.

[D] Either Lever Locks or Releases a Third. In the circumstances where it is required for a lever to be locked by any of a number of other levers, a Weighted Main Lock is employed. By examining Figures 9a and 9b (lever 5) the weight portion of the lock can be seen projecting to the rear. The weight tends to hold the lock up, which would clear the lock stud on the lever. Should all soldiers that engage the lock rod of the Weighted Main Lock be in their normal position, that is standing vertical, then the weight will hold the lock up so that lever is free. Movement of any soldier towards reverse will push the lock rod, act against the weight, and lock the lever.

To effect the release of a lever by one of a number of other levers, a different configuration is necessary. The connections to a Back Balanced Branch Lock are illustrated in Figure 12. The cams used to drive the locking are open

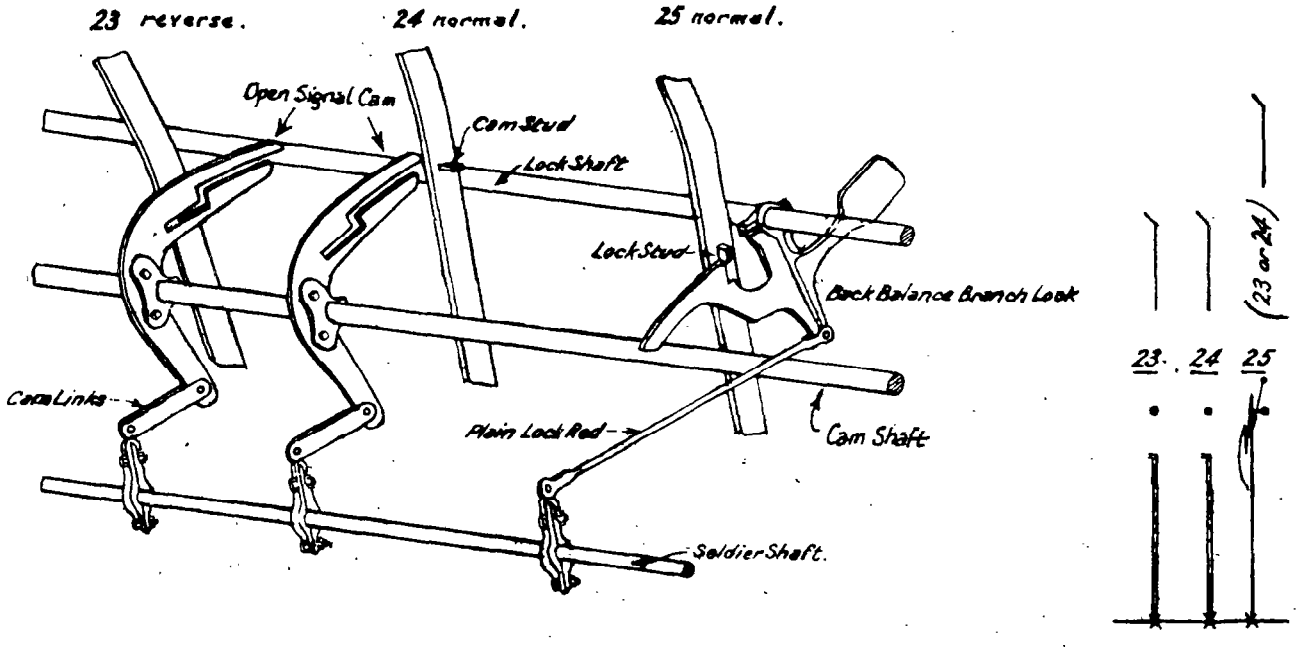
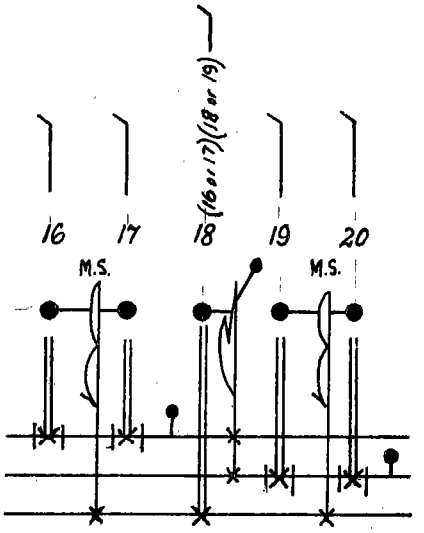


Figure 12.

at one end and have only one lift. Open Cams are only used with Back Balance Branch Locks and because they have only one lift, they impart a travel of 1 1/8" to the cam links. All open cams for any one Back Balanced Branch Lock work the same shaft. As one of the levers that does the releasing nears reverse, the Open Cam moves the shaft. All other Open Cams, because they are rigidly connected to the same shaft, will lift. At the same time the Back Balanced Branch Lock will start to drop away from the lever stud. There must be locking between all levers fitted with Open Cams so that when any Open Cam lever is reverse, all others are locked normal. A cam stud under the cam instead of in the cam slot will either jamb or break the locking.



Locking Sketch Diagram

Figure 13b

A Back Balanced Branch Lock is also used in the situation where a lever is to be released by any one of two or more groups of levers. To perform the locking function, standard cams, a slotted lock rod on the lock, and slotted cam links are necessary. In addition weights are required to assist the shafts as there is no direct drive to the locking because of the need to have slotted cam inks. The general configuration is shown in Figure 13. Slotted cam links can be used in other special circumstances to effect economies in the provision of shafts etc., but their applications are individual to each case. In Figure 13, levers 16 or 17 are drawn reverse. The shaft weight on the first shaft is pushing the lock rod down releasing lever 18. The placing of either lever 16 or 17 to Normal will turn the shaft and the back weight on the lock will cause the lock to swing up and lock lever 18.

[E] Special Situations. There is at odd times a need to lock a lever reverse but not normal. To do this task a Block Lock is fitted. Block Locks look very much like Main Facing Point Locks, but have extra metal built up where the Normal locking face would be on a facing point lock. In operation, the lever fitted with the cam cannot be pulled until the lever fitted with a Block Lock is in reverse. Then if the cam lever is pulled the Block Lock secures its lever in reverse. A moments reflection reveals that the cam fitted lever is in this case being released by the lever with the Block Lock. As space for locks on No 5, 5A, 6 and 6A pattern apparatus is limited, it is essential to use lock space and soldier shafts economically. The Block Lock is actually a "reverse release" and can save a soldier shaft. In the example above if a Block Lock was not used, the Block Lock lever would have a cam to drive a Branch Lock on the other lever, which in many cases will have a cam for some other part of the locking. Figure 16 shows a Block Lock.

Continuing on in the same theme of economy of shafts and lock spaces is the Double or Special Lock. This curious monstrosity is actually a "reverse main facing point lock" and is used to save a cam and a shaft. Its usual application is for locking crossovers or points in the rear of starting signals. The starting signal lever is fitted with a double lock operated from a cam on the point lever. The lock rod for the double lock is always plain in that it never has cages for multiple operation. The point lever is free to pull or put back to normal whenever the signal lever is normal. When the signal lever is out of normal the stud on the signal lever will traverse the lower race of the double lock if the points are normal. Should the point lever be reverse then the signal lever stud will traverse the upper race of the double lock. It can be seen in Fig. 14 that when the signal lever is pulled the points are locked in what ever position they are in at the time by the stud in the race of the double lock.

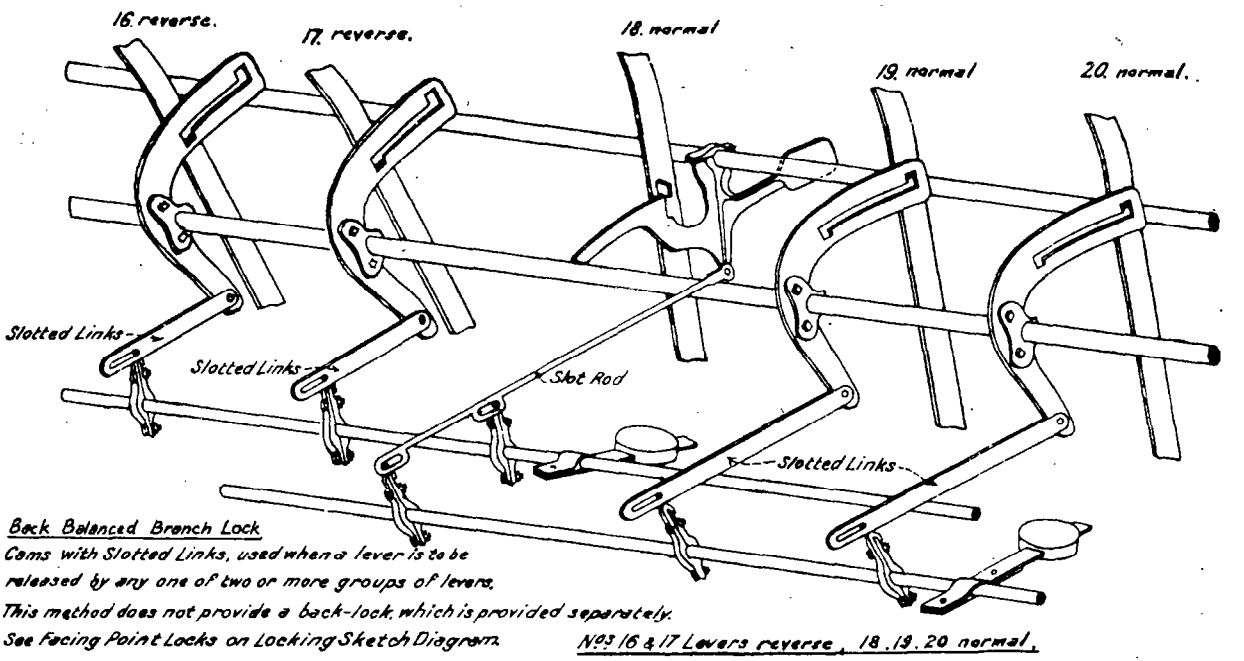


Figure 13a

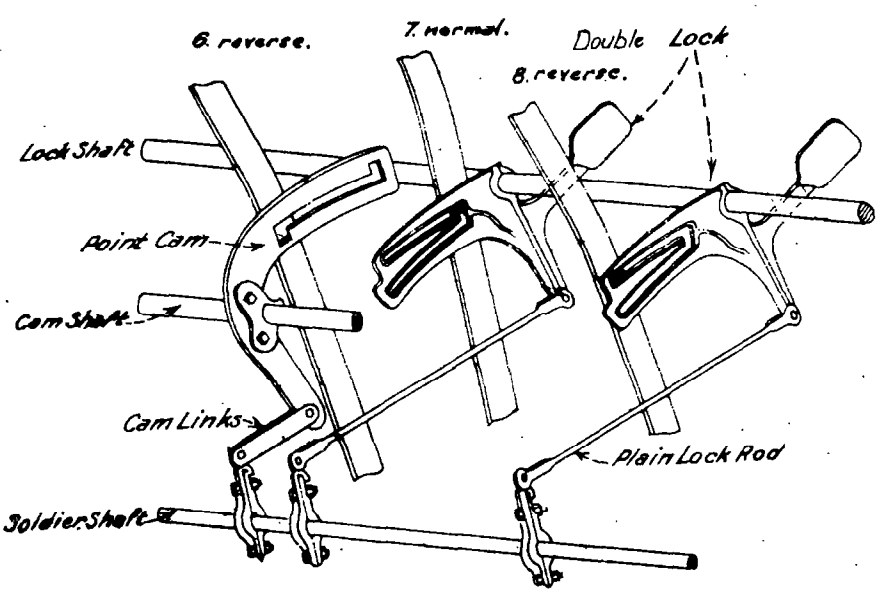
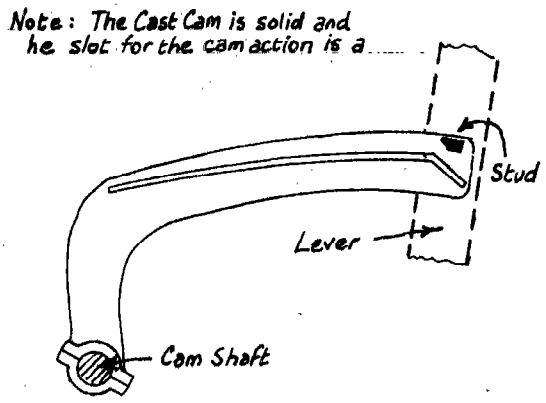
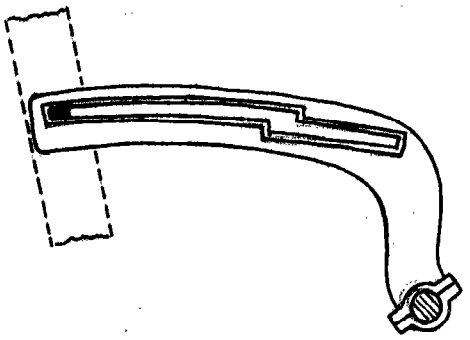


Figure 14.

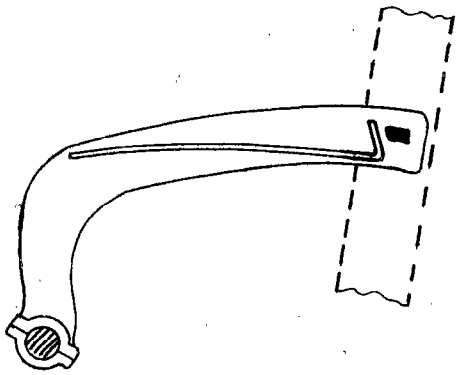
There are often situations where adjacent levers will be required to lock or release each other. Normally this means that the lever being locked or released will have either a Main or a Branch Lock and the controlling ever will be fitted with a cam. If space for locks is short because of other locking requirements or neither lever has a cam (provision of a cam will also require a shaft) then a Cast Cam might be used. Since it is uncommon for a lever to have more than one cam (a lever may have a cam and an open cam) there is always plenty of space in this part of the locking. Cams may be fitted to either side of a lever with the exception of levers next to "A" frames therefore space can readily be made between two levers.



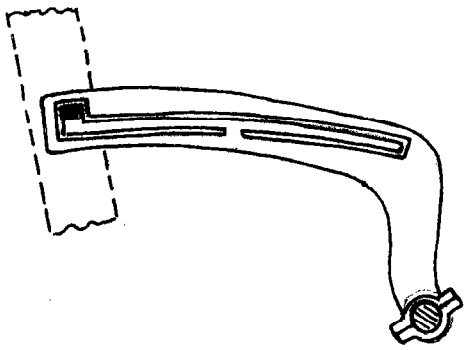
Main Cast Cam (lock side)



Main Cast Cam (cam side)



Branch Cast Cam (lock side)



Branch Cast Cam (cam side)

The Cast Cam is driven by a modified cam stud on its cam side. On the locking side, a lock stud fitted in the cam stud position on the next lever. The cam portion has only one lift incorperated, for a Main Cast Cam the lift is in the "B" position. The Main Cast Cam can be used in left and right hand applications. The Branch Cast Cam comes in left and right handed versions and has its lift in the "D" position. The handing of the Branch Cast Cam refers to the side that the cam face is on and so the released lever is on the other side.

MISCELLANEOUS FITTINGS

It is possible to save the use of a shaft in some cases by having slotted cam links. A number of cams may then work the same shaft to perform the

same locking funtion. If a rigid drive connection is desired on one of the cams this can be overcome by coupling the cam driven shaft to the lock shaft by slotted links. The connection takes the form of slotted set back links. Set back links are explained a little further on.

In a large frame the locking driven by any one cam can become so heavy with locks and lock rods that levers may be hard to ull or the cams might suffer undue wear. To counteract this weight, shaft weights are clamped to soldier shafts as required.

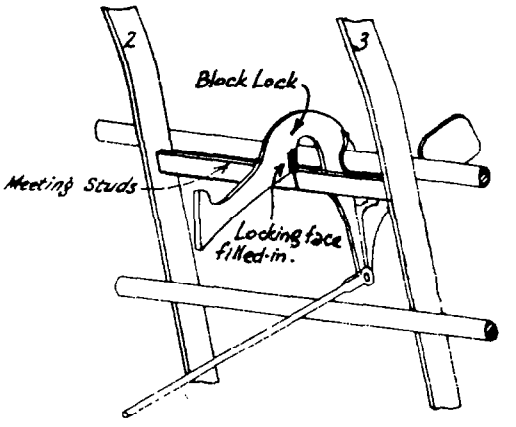
Another problem experienced in large frame is the need to terminate a soldier shaft in a shaft bracket to allow the continuing shaft to be worked by another cam. In these circumstances it is sometimes necessary to transfer motion of a soldier shaft forward or backwards to another shaft for continuation along the apparatus. The transferring is done by fitting a soldier to each shaft concerned. These soldiers, which are in line are coupled together by Set Back Links, identical in appearance to cam links.

The soldier shafts can only be made so long and when an apparatus is longer than a certain length, the soldier shafts are joined. Shaft couplings consist of two halves that are held together by 1/2" bolts that pass through both halves of the coupling and through holes drilled in the ends of the shafts.

Lock rods are not always straight. In many cases locks being adjacent to each other will necessitate the lock rods having a side set or two side sets. Cams can be fitted directly above all but double locks, therefore the lock rod or the cam links to have side sets so that they do not foul.

Meeting studs are another space saving arrangement that can be used in some cases. When two adjacent levers require the same locking or releasing conditions then the lock studs are extended until there is 1/16" between the almost touching ends. The lock straddles the abutting studs and so has the same locking action on both levers. Figure 16 is a diagram of meeting studs.

Levers Nos 2 & 3 in "normal" position.



Levers Nos 1, 2 & 3 in "reverse" position.

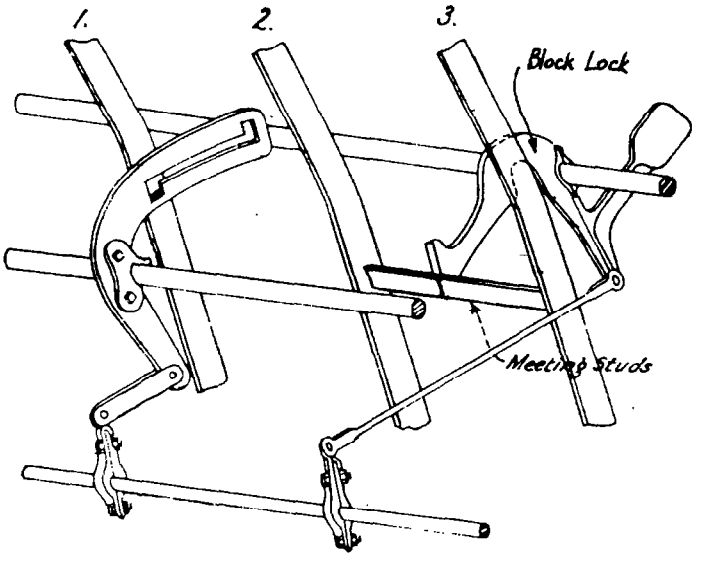
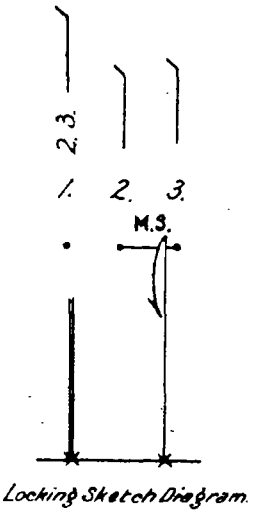


Figure 16.



Locking Sketch Diagram.

(to be continued)

SAFEWORKING OPERATIONS OF THE BALLARAT ELECTRIC TRAMWAY SYSTEM

by Neville Gower.

The transformation of the Ballarat Tramway system from a horse drawn to an electric traction operation commenced in 1905. Not only did this lead to a more frequent service but it also required the relocation of loops on the largely single line trackwork.

It is not known what form the safeworking prior to 1905 had taken but the absence of loops on all but two of the routes may suggest that the practice was probably one car on the route at a time. However, that does not throw much light on the two routes which had loops. At least the possibility of one horse car per routes on most lines would be consistent with the comparative increase in service after 1905.

Sometime during the electric operations of tramway there were a series of staffs for safeworking.

Location of Loops		
Route	Horse Drawn Era	Electric Traction 1905-1934
Gardens	1. nr Service St.	opposite Service Street.
	2. in Gardens.	Hamilton Ave & Sturt Street.
	3. nr Barrett Ave.	in Gardens 80m north of BTPS depot turnout.
	4. nr Mill St in in Wendouree Pde.	in Gardens adjacent to North Lodge Gates.
	5.	150m east of Car Sheds.
	6.	between Cardigan and Gnarr Streets, Wendouree Parade.
	7.	between Mill St & Victoria Ave., Wendouree Parade.
	8.	between Mill & Duncan Sts., Drummond St. North.
Sebastopol	via Skipton Street	
	1. nr South Street.	between South & Sebastopol Streets
	2. nr Sebastopol St.	between Darling & Bell Sreets
	3. Rubicon Street	Rubicon Street
	4. Vickers Street	

The change to above routes enabled the electric cars to share more of the duplicated track between Sturt Street and provide the required peak frequency between Grenville Street and Rubicon Street, Redan.

The other routes received the following loops for electric car working:-

MOUNT PLEASANT
1. between Porter & Eastwood Streets.
2. south of Bradshaw Street.

ORPHANAGE (VICTORIA ST)
1. between East & Princes Streets.
2. Stawell Street (Half D Loop)

LYDIARD STREET NORTH
1. between Clarendon & Macarthur Streets.
2. between Howard & Gregory Streets.

Reference to the work of W.H.Jack, and other earlier authors on the topic of safeworking, reveals that there could be variance as to the actual location of some loops. Before reconstructing the tramway system in the mid 1930's, the State Electricity Commission (SEC) conducted an accurate survey of all routes within both the City of Ballaarat and the Borough of Sebastopol. Currently, a set of most of the Ballarat plans are housed in the Gold Museum at Sovereign Hill whilst at least one plan for Sebastopol Borough is held by the Sebastopol Historical Society.

One loop that is regularly included in present day diagrams of the former system, which does not appear on the SEC plans, is the loop between Wendouree Parade and Drummond Street North. The notes of James, an SEC Inspector, also ommited the loop. Possible explanation is that when the electric car system opened, not all reconstruction and conversion of the system had been completed; or travel to and from the Gardens via Wendouree Parade and Ripon Street North was more frequent than latter day services. (Even the SEC cars contained the destination sign Gardens via Ripon Street North.)

With the coming of the electric tramcars came an increased frequency reported by Wal. Jack, "A four car tram programme was introduced and this table served from April 1913 to August 1937 - 24 years. A twenty minute service to Sebastopol from 7am to midday, and from midday until 8pm a twelve minutes service between City and Rubicon Street and 24 minutes beyond, reverting to the morning schedule again from 8pm until 11pm."

Whether all single line sections of track were worked by staffs is debatable because of insufficient evidence, however, at the closure of the tramway system there existed at least nine brass staffs for the Sebastopol and Gardens routes. Examination of these staffs many years ago indicated that some section staffs were altered for SEC operation and to match the new loop sites.

The following markings:

Sturt Street - South Street
Darling St. Loop - Rubicon St. Loop
Sturt Street - Rubicon Street.

confirm Wal Jack's notes for tramway frequency for most of the 1913-1937 period, in that the first two were part of a set for the 12 minute afternoon frequency. As there was a period between 1934 and the completion of the "Forest City" signals in 1938, the SEC must have used these staffs, either as is, or modified to fit the new loops. This statement is confirmed by the presence of the following staff:

Urquhart St. Loop - Grey St. Loop

The loop names also suggest that once Rubicon Street came out, the Sebastopol service may have changed to a 20 minute peak and 30 minute off-peak operation.

During 1934-1937, the SEC refurbished the tramway. The Lydiard Street North service, which had previously been confined to the City of Ballaarat boundaries was extended to the New Cemetery. Within the system, a number of loops were relocated.

1934-1937 Loops	
Route	Loop location
MOUNT PLEASANT	between Young and Grant Street.
VICTORIA STREET	King Street
LYDIARD STREET NORTH	Seymour Street
	north side of Gregory Street
SEBASTOPOL	south of Urquhart Street
	north of Leith Street (Bell Street)
	north of Grey Street
GARDENS	Parker Street
	Russell Street
	Carlton Street
	"parking loop" within Gardens
	Gardens Loop
	Car Sheds Loop, nr Barrett Ave.
	Martin Avenue
via Ripon St. North	Victoria Avenue
via Drummond St. Nth	Duncan Street
	High Street

Of the five remaining staffs held by the Ballarat Tramway Preservation Society, each shows signs of alteration during the period of SEC operation. Because of the insufficient evidence, it can only be assumed that there were staffs available for all sections. With the survival of a staff mared Victoria Park Loop - Carlton Street Loop, it is highly probable that on soem routes servives could operate at a frequency of less than 20 minutes.

Certainly, the details on the surviving staffs suggest that staffing was based upon a 20 minute peak, 30 minute off-peak.

"Twenty Minute Service"

Pleasant Street	Carlton Street Loop
Carlton Street Loop	Haddon Street Loop
Car Sheds Loop	Macarthur Street Loop

It should be noted that with SEC alterations, the loops spaced out more than previously. Conjecture can suggest that either the original system was laid out for a frequent holiday service, or the SEC vehicles operated at a higher speed.

The four remaining staffs are associated with the Gardens routes:

Pleasant Street	Carlton Street Loop
Carlton Street Loop	Haddon Street Loop
Car Sheds Loop	Macarthur Street Loop
Pleasant Street	Gardens Loop North

Again these staffs suggest that the SEC used these staffs on a 20 minute peak and 30 minute off-peak operation. One cannot offer an explanation as to why two of the staffs covered the common section between Car Sheds Loop-Haddon Street unless there were other timetables or sections.

In 1937, the SEC introduced a trolley operated colour light signalling system, known as "Forest City" signals. By 1938 all the system except the View

(continued on page 60)

OPENING OF NEW LINE BETWEEN ELMORE AND COHUNA 10 NOVEMBER 1915 -WN 46/1915

1. The above mentioned new line is now open for general passenger and goods traffic. See S 7910/15 for timetable.

2. The mileages of the stations on the new line from Melbourne are as follows:-

Station	Miles	Station	Miles
HUNTER	135 1/2	PATHO	165 1/4
WARRAGAMBA	140 1/4	GUNBOWER	172
BAMAWM	147 3/4	LEITCHVILLE	177
KOTTA	152 1/4	KEELY	181 3/4
KYEMERY	157 1/4	COHUNA	185 1/2

3. (a) An Up Home signal for the Cohuna line is provided at Elmore, Up and Down Home signals are provided at Bamawn and Gunbower, and a Down Home signal is provided at Cohuna.

(b) Add Bamawn, Gunbower and Cohuna to the list of places where Fixed Signals are provided, pages 326-337 of the Book of Signals, and also add Up Home signal for Cohuna line at Elmore.

(c) Add Hunter, Warragamba, Kotta, Kyemery, Patho, Leitchville and Keely to the list of stations where Fixed Signals are not provided, pages 67-72 of the General Appendix.

(d) The facing points in the Main line at Elmore, Bamawn, Gunbower and Cohuna are plunger locked. For instructions regarding plunger locking see pages 102-106 of the General Appendix.

4. The Passenger platforms at Hunter, Warragamba, Kotta, Kyemery,Patho, Leitchville and Keely are 200' in length, and the Passenger platforms at Bamawm, Gunbower and Cohuna are 300' in length.

5. The points in the main line at each end of the station yard at Hunter, Warragamba, Kotta, Kyemery, Patho, Leitchville and Keely are rodded to a derail in the siding and each set will be worked by a lever. The points in the Main line are staff locked, the key being the staff for the respective sections.

6. Hunter, Warragamba, Kyemery, Leitchville and Keely are Caretaker Stations, and Kotta and Patho are No-One-in-Charge Stations. Hunter and Warragamba are supervised by Elmore; Kotta, Kyemery and Patho by Bamawn; and Leitchville and Keely by Gunbower. Add to C 7/11.

7. (a) Elmore, Bamawn, Gunbower and Cohuna are Staff Stations. The sections Elmore-Bamawn, Bamawn-Gunbower and Gunbower-Cohuna will be worked in accordance with the Rules as contained in Appendix II of the Book of Rules and Regulations, the Supplementary Instructions shown on pages 343-356 inclusive of the General Appendix, and all other Instructions applying to Single Lines worked under the Train Staff and Ticket System of working. Train Staffs and Staff Ticket Boxes, properly lettered for the sections, are in use.

(b) BAMAWN AND GUNBOWER-To facilitate the crossing of trains at Bamawn and Gunbower there is a dead-end extension at each end of No 2 road so that, when necessary, a train may be permitted to draw forward clear of the

trailing points of the crossover road. The Home Signal, worked from the lever at the points must not be lowered until the train to be admitted to No 2 road has been brought nearly to a stand and a Green Hand Signal has been exhibited to the Engine-driver and Guard in accordance with clause 4 of the instructions, page 102 of the General Appendix.

(c) The points lie normally for the dead-end extensions at each end of No 2 road and the Engine-driver of any train that requires to proceed out of that road must not go forward until there is a man at the points to turn the train out.

(d) A RED LIGHT must be exhibited on the buffer stops of each dead-end extension at dusk and in foggy weather.

(e) Vehicles must not be permitted to stand in the dead-end extensions, which must be used exclusively for crossing trains.

(f) Telegraphic communication is provided at the Staff Stations. Telephone communication will be provided at the Caretaker Stations later.

8. FENCING OF LINE-Details of portions of the line unfenced:-

Mileage from Elmore							Portion Unfenced		
M	Ch	Lks		M	Ch	Lks	M	Ch	Lks
0	0	0	to	20	0	0	0	30	0
20	0	0	to	30	0	0	Nil		
30	0	0	to	43	0	0	1	0	0
43	0	0	to	49	0	0	Nil		
49	0	0	to	53	0	0	5	60	0
							Counting fencing on both sides of line.		
53	0	0	to	57	20	0	8	44	0
							Counting fancing on both sides of line.		

Enginemen and Guards must keep a good look out for live stock when travelling over the unfenced portions of the line, and the maximum rate of speed must not exceed 20 miles per hour. Cattlepits are provided at all P.C.R. Crossings. Mile, half-mile,whistle here, stop look and listen, and curve boards provided.

9. The ruling grade is 1 in 100 and the sharpest curve is 25 chains radius.

10. (a) Until further notice, the maximum rate of speed over the fenced portions of the line will, subject to the conditions imposed in pages 176-194 inclusive of the General Appendix, be as under:-

Line or Portion of Line between	Maximum Rate of Speed			
	Funnel First			Tender First
	Psgr trains with no 4 wheel vehicles.	Psgr trains with 4 wheel vehicles and Mixed and Goods trains.		All Trains
	Miles per hour	Miles per hour		Miles per hour
ELMORE-COHUNA	25	25		20

Add to the list, page 177 of the General Appendix.

WATER SUPPLIES-There are temporary supplies at Bamawm and Gunbower. Later there will be a 10,000 gallon tank at Cohuna but at present this is not available.
The Loco Roads lead off No 3 and 4 roads at the down end of the Cohuna yard. A 53' turntable will be provided later. Permission is given for engines to run tender first until the turntable is provided.
The classes of engines allowed to run on the line will, until further notice, be 70 per cent. D and lighter axle load classes only. Add to Weekly Notice 9/14, clause 2.

11. OFFICERS' DISTRICTS

(a) Add to district of the District Superintendent at Bendigo, page 23 of No 1 Supplement to the General Appendix.

(b) Add to district of District Rolling Stock Inspector at Bendigo, page 536 of the General Appendix, and to the district of Depot Foreman at Bendigo, page 537 of the General Appendix.

(c) Add to the districts of Superintending Roadmaster McDonald, Roadmaster Robinson at Bendigo, and Worksmaster Oakley at Bendigo, pages 539-542 of the General Appendix, and to the district of Mr. Waycott, Inspector of Interlocking.

(d) Add to district of Block and Signal Inspector, No 4 District, page 534 of the General Appendix, who will provide the necessary books and forms.

12. GOODS BUSINESS-The following stations will be open for general Inwards and Outwards Goods traffic:-

Name of Station and Brand		Class of Shed Provided	Class of Goods Platform	Goods Sidings
Hunter	HTR	Van Goods	Ramped	One 16c loop siding.
Warragamba	WRG	Van Goods	Ramped	One 16c loop siding.
Bamawm	BAW	Goods	Ramped	Two 18c loop sidings and one dead-end siding for stockyards.
Kotta	KTA	Shelter Shed with locker	Ramped	One 16c loop siding.
Kyemery	KYM	Van Goods	Ramped	One 16c loop siding.
Patho	PTH	Shelter Shed with locker	Nil	One 16c loop siding.
Gunbower	GWN	Goods	Ramped	Two 18c loop sidings. and one dead-end siding for stockyards.
Leitchville	LLE	Van Goods	Ramped	One 16c loop siding.
Keely	KEE	Van Goods	Ramped	One 16c loop siding.
Cohuna	COH	Goods	Ramped	Three 56c loop sidings. and one dead-end siding for stockyards.

Combined Stock Trucking Yards have been provided at Bamawm and Gunbower. Leitchville and Cohuna will be similarly equipped later. The receiving days at Melbourne Goods Sheds for these stations are Tuesday, Thursday and Saturday; closing at 3.0pm.
The receiving door of "A" Shed is No 51. No crane power has been provided.
Add to Index of Working Timetable, and to A. 2720/15.

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SAFEWORKING OPERATIONS OF THE BALLARAT ELECTRIC TRAMWAY SYSTEM

by Neville Gower.

(continued from page 56)

Point (Ripon Street North) operated under this system of safeworking. Keith Kings (1971) and Somersault (1987) have recently republished the operating instructions dated 20 July 1961 for this syetm. Part of the system still remains operational on Wendouree Parade.

When the SEC handed over a considerable amount of archival material to the Ballarat Tramway Preservation Society, included were eight printer's blocks for the tram timetables. Based on a twenty minute service, the blocks are:-

0 -20 -40, (2) 14 -34 -54, 10 -30 -50, 7 -27 -47,
11 -31 -51, 8 -28 -48, 19 -39 -59.

Without having seen any service timetables, one is unable to determine the likely period they were used for printing of the public timetables.

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VICTORIAN RAILWAYS - TRAFALGAR-MDE

PRIVATE SIDING FOR GIPPSLAND BLUE METAL AND FUEL LTD. - 76 miles 67 chains

(reprinted from Weekly Notice No

On 19 November 1925, the points in the main line at each end of the above siding were rodded to catch blades, with deflecting rails in the siding and secured by Staff Locks, and the siding is now ready for use, in accordance with the following instructions:

1. The siding consists of a loop siding and a spur siding leading from the centre of the loop to a dead-end, these points are facing in the up direction.

2. The spur siding is 1200' in length from points to buffer stops and crosses a road by open level crossing 440' from points in loop siding. Gates are provided at each side of the roadway, and siding holders will be responsible for these being closed and secured across the roadway when not otherwise required for use. Siding holders will also be responsible for having the gates opened in good time for the passage of railway vehicles.

3. A notice board lettered "ENGINES MUST NOT PASS THIS POINT" was erected 100' and a scotch block 40' inside the second gate.

4. There is standing room for 16 (25') vehicles in the loop on the upside of the spur points and 20 trucks on the down side. There is accommodation for 20 vehicles between scotch block and buffer stops on spur line.

5. The grades of the sidings are as follows:

SPUR SIDING - 1 in 125 rising from loop to notice board thence 1 in 100 rising to buffer stops.

LOOP SIDING - 1 in 130 falling from points leading to spur siding to catch blade at up end thence 1 in 60 falling to main line. 1 in 60 falling from the main line points at the down end for 340' then level to points leading to spur siding.

6. Siding holders must accept delivery of inwards trucks between Notice Board and buffer stops, and give delivery of all outward trucks properly coupled up with doors closed and secured and ready for a straight pick up on loop siding clear of hand points.

7. Siding holders will be responsible for the protection of level crossing and the braking to trucks when placing them on loop. Guards of trains working this siding must strictly comply with Regulation 204. (WN47/1925) (A 2861/25)

(Editors Note: Weekly Notice No 34 of 1936 indicated that the Gippsland Blue Metal and Fuel Ltd. siding was abolished, and the connections and staff locks were removed.)

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