Public Works (1899) Departme.

RAILWAY BRANCH.

G.O., No. 307-8 Ry.

DATED 18th March 1899

[Despatch Abstract.]

Dutton's interlocking points & signals

Ordered that a copy of a Joint Report by the officers of H. H. the Nizam's Ed. State Railways, on ——, be forwarded to the Govt. of India with certain remarks.

Forwarded

[P. W. Rv. 500—7-13-98]

Indexed.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

SERIAL No. 59

Public Works (1898) Department.

Railway.

CURRENT No. 1238

No 2950

Dated 28th Octr 1898.

From ER

To AM. A

Order N.S.B.

Sir

(In continuation of my S12 56 letter No. 2742 dated the 5th October 1898.) I have the honour to forward herewith a note by Lt Col. Rendel on Dutton's trailable facing point locks, which has been received from the Govt of India, and to request that you will be so good as to report fully on the alleged defects of the apparatus.

2. An early reply to this & my previous letter is requested.

Despatched on 28/10/98

ER. 28.10.98

From The Govt of India in Circulate

No. 1256 R.S.

Dated 14th October 1898.

Received

Registered } 25-10-98

Enclosures 4

Spare copies

D/ The communication to A has been added - but the letter will be omitted in the S.R. 28.10.98

SUBJECT.

Dutton + Kay's signalling and interlocking arrangements

Forwarding a printed copy of Sir A. M. Rendel's note dated 3rd Jany: 1898 on Duttons trailable point lock and requesting that Govt. Engr. may be directed to inquire into the alleged defect & report further on the subject when submitting his report in connection with Puttur station on the M&S.

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

Sir A. M. Rendel's note, dated 3rd January 1898, upon the system of signalling proposed for the Bengal-Nagpur Railway.

The indent sent home asks for a certain system of signalling and a certain make of apparatus, but the Government in sanctioning the indent make the proviso that the system adopted must have the approval of his Company's Consulting Engineers.

The system proposed involves the use of trailable facing point locks and the make of apparatus is that of Messrs. Dutton whose agent is now in India.

The object of the facing point lock is to ensure that the points shall be held tightly in place whilst trains are passing. They are required only for trains passing in the "facing" direction, but by their construction they lock the points also for trains passing in the opposite or "trailing" direction. If therefore trains "trail" through such points when the road is not set for their reception either the apparatus is broken or the train is derailed.

To meet this difficulty what is called the trailable lock has been devised by which whilst the points are locked for trains passing in the facing direction there is no lock against trains coming from the opposite direction so that if the road is wrongly set no damage is done by "trailing" through.

But this result is accomplished, in our opinion, at the cost of diminished efficiency of the apparatus as a facing point lock and the risks at facing points demand that the greatest precautions should be adopted to secure them.

Trailable locks are not tolerated by the Board of Trade in England and both in England and India trailing through wrongly set points is strictly forbidden whether they be locked or not.

It is alleged in India that this "trailing" through points is constantly practised notwithstanding orders to the contrary, and that it will be impossible to break drivers of the habit and if, therefore, automatically locked points are used they must be made trailable.

Although we are not prepared to say that a trailable facing point lock should never be used, we do not think that a statement that drivers cannot be made to obey orders, is a sufficient reason for adopting them, because, in the first place, we suspect that the difficulty with the drivers is largely due to the existing points not being provided with proper indicators to show how they are set, and, in the second place, because given automatic points and indicators it should be possible to detect disobedience and so check it.

If therefore it were only a question of the disobedience of the drivers we should entirely discountenance the use of trailable facing point locks, but under the present recommendation of the Government Committee on signalling there are circumstances under which the responsibility for trailing through wrongly set points would rest with the Station Master or signal-man whose forgetfulness, or loss of nerve, would form as great a risk as disobedience of drivers.

The Government Committee deal very fully with the precautions necessary for the reception of trains but say little or nothing about those necessary for their despatch. The facing points at the entrance are to be protected by interlocked signals, the object of which is to show the driver by which road he is to enter and that entrance by it is safe; but similar precautions are not proposed for his exit. He and the Station Master are to rely on an indicator placed at the points to show their position. In a stopping train this is sufficient but with a through train it is a different matter. In this case it becomes the duty of the Station Master to see that the points at the exit of the station are properly set before lowering his home signal, but he might easily forget this duty, in which case an accident might happen. This arrangement meets the conditions laid down by the Committee, but is certainly opened to criticism.

The remedies for such a condition are :—

(1) the use of trailable locks by which the serious consequences of the Station Master's mistake would be avoided, or

(2) the adoption of the starting signals as used in England in connection with ordinary facing point locks.

The objection to the first is, as we have explained, the diminished efficiency of the lock in the facing direction. The objection to the second is the cost.

In England the Board of Trade insist upon the use of starting signals and, as we have said, refuses to allow the use of trailable locks.

The question to be decided is the measure of security to be afforded, whether the decreased efficiency of a point lock owing to its being made trailable is such as to justify the cost of introducing starting signals. When considerable through and suburban passenger traffic is expected we think that the use of starting signals is justified as they will certainly give the maximum of safety ; but at the same time we are not prepared to say that accidents will result from the use of trailable locks of good quality nor are we in a position to gauge the amount of safety they will afford as there has been but little experience with them.

As regards the pattern of apparatus we are of opinion that Messrs. Saxby & Farmer's pattern of trailable lock is better than the one suggested in India, Messrs. Dutton's, and if such locks are used we think that the order should be given to Messrs. Saxby & Farmer. If ordinary locks are used in conjunction with starting signals we think that competition may be resorted to, with advantage.

In respect of the comparative cost of the two systems we should think that the starting signal arrangement would probably cost about £60 per station more than the trailable lock installation, but a more exact comparison can be made up on receipt of the tenders now to be invited, as Messrs. Saxby & Farmer have been asked to submit alternative tenders for the two schemes.

2/ P.W.Rly ers°-1238/98

G. C. Press, Simla.—No. 1257 P. W. D.—17-10-98—30.

No. 1256 R.S.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY STORES.

All communications should be addressed to the Secretary.

JOINT SECRETARY TO GOVT. OF MADRAS P.W.D. RECEIVED 25 OCT 1898

To

The Joint Secretary to the Government of Madras,

Public Works Department, Railway Branch.

Simla, the 14th October 1898.

Sir,

S 63 In continuation of Government of India Public Works Department letter No.1042 R.S., dated 20th September 1898, requesting that the Consulting Engineer for Railways Madras may be called upon to submit a report on the result of the use of Dutton and Company's signalling and interlocking arrangements at Puttur Station on the Madras railway, (referred to in the Government Inspector's report accompanying your No.1646 of 29th May 1896) and enquiring whether the restrictions of speed imposed by the Government Inspector in 1896 may now be relaxed; I am directed to forward herewith, a printed copy of Sir A.M.Rendel's note dated 3rd January 1898, on Dutton's trailable point lock and to request that the Consulting Engineer may be directed to enquire into the alleged defect and report further on the subject when submitting his report in connection with Puttur Station.

S 12

Collect opinion & submit after I have myself minutes 7/11 16/11

2. I am to observe that it would appear that a restriction of speed over the facing points fitted with the device referred to in paragraph 11 of the Inspection Report of His Highness the Nizam's Guaranteed State Railway for

SN°42a

the

the half year ended 31st December 1897 may perhaps be necessary.

I have the honour to be,

Sir,

Your most obedient servant.

C S Cole

Offg Under Secretary.

17/10

Documents accompanying.

Printed note referred to.

+ 4 copies

K.P.G.

South Indian Railway.

Copy of a letter, No. C/6245/2275, dated 1st November 1898

from the Chief Engineer, South Indian Railway,

to the Agent, South Indian Railway.

Your letter No. R1210/3/1867 of 29th ultimo

Interlocking arrangements

Dutton's system

The patent trailable lock of Messrs Dutton and Co. which we have had in use at 4 stations for some months past have shown no signs of weakness and they appear to me to be a perfectly secure lock in a facing direction and have proved as safe as the Saxby and Farmer's lock in use at Villupuram.

The running through points in a trailable direction is not recognized on this Railway, but it does take place against orders and it is well to have a lock that will not break under such circumstances.

At the opening of the Tiruvallur installation, the security of the lock was tested by endeavouring to force open the points with a crow bar and although they could be moved it required considerable power to do this. The point is also further secured by a locking bar.

I should like to hear the opinion of the other Railways that have tried this lock.

The enclosure is herewith returned.

AGENT'S OFFICE,
TRICHINOPOLY,
3rd November 1898.

True copy.
A.D.G. Shelley
Capt RE
Agent.

Accompaniment to the Agent's letter
No. 987 of 3-11-1898 Mat.

ENC. NO. 1 5162 8
DRAWING NO. 987 13-11-98
FROM A.S.

No. 987

South Indian Railway Co., Ld.,

AGENT'S OFFICE,

TRICHINOPOLY, 3rd November 1898.

SERIAL NO. 61

5162
4-11-98

CONSULTING ENGINEER FOR RAILWAYS
RECEIVED
4 NOV. 1898
MADRAS.

From

The AGENT,
SOUTH INDIAN RAILWAY,

To

The CONSULTING ENGINEER FOR RAILWAYS,
MADRAS.

Sir,

SNo 59

In compliance with the request contained in your letter No. 2950 of 28th October 1898, I have the honor to forward copy of our Chief Engineer's letter No. C/6245/2275 of 1st November 1898 regarding Dutton's Trailable Locks for Points.

I have the honor to be
Sir
Your most obedient Servant

A.D.G. Shelley Capt R.E.
Agent

1 Enclosure

M&S

SERIAL
No. 73

RAILWAY.

Government {1899} of Madras.

PUBLIC WORKS.

Recd.	1899.	*Enclosures*
Regd.		*Spare copies*

G.O., No. 232 Ry., 24th February 1899.

FEBRUARY.

Report of Inspection of the Madras Railway System

The — for the half-year ending the 31st December 1898, ordered, with remarks, to be forwarded to the Government of India for information.

From
The Agent,
South Indian Railway,
Trichinopoly.

To
The Consulting Engineer for
Railways,
Madras.

Dated
Received } 18

No.

Enclosure.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following paper:—

MADRAS RAILWAY.

STANDARD, 5′ 6″, GAUGE.

Total mileage open to traffic, 849·22 miles.

Inspection Report for the half year ending 31st December 1898.

Madras viâ *Arkonam to Raichur. By the Senior Government Inspector.*

1. *General.*—This section was inspected on the 9th, 10th and 11th of January. My inspection was made concurrently with that of the Company's Chief Engineer. The District Traffic officer was present during the greater part of the time.

2. *Formation.*—Banks and cuttings were all in their usual good order.

3. *Bridgework.*—I found no fault in the bridges which were inspected. The two northernmost spans of the bridge at mile 107 require an apron of loose heavy stone for a breadth of fully 30 feet downstream from their flooring and drop-walls. The training embankments recently made at this bridge seem a good job. The bridge at mile 142–10, 2 spans of 64 feet, has now been strengthened by the insertion of intermediate piers. The same has been done at the bridge consisting of 4 spans of 64 feet at mile 232–3. The same is about to be done at the bridge at mile 232–10, but as yet only the foundations have been laid. A breach occurred during the south-west monsoon of last year at a small culvert at mile 340–13; it seems to have been due to the heading up of the water of a certain nullah running parallel to the railway, owing to the growth of jungle in its bed and to its having become generally obstructed. I agreed with the Chief Engineer about the best means for dealing with the difficulty and proposals will doubtless be submitted in due course, in time to get things right before next flood season.

4. *Bridge strengthening scheme.*—The scheme for strengthening the weak girders throughout the whole of the Madras Railway has been matured, and will now go forward without obstruction. The building of intermediate piers above referred to is a part of the scheme.

5. *The road.*—This throughout is in a very excellent state of upkeep, allowance of course being made for the age and state of wear of the old iron rails which have been 30 or 40 years in the road. The inspection train ran at speeds of 45 to 55 miles per hour, and the road is quite fit for such speeds. I stopped at several places to examine the state of the iron rails, places stated by the Engineers to contain the worst rails they have to show. They are worn of course, and an occasional rail may have a slightly broken down place, and most of them are more or less battered at the last inch or two near the joints. But there is no wholesale break down; and, provided that ordinary renewals are systematically carried out, a good deal of work will still be got out of the old iron rails.

6. *Rail renewals.*—The old 75 lb. double-headed 20-foot iron rails are being gradually replaced by similar steel rails, the substitution being carried out on a regular system. When rails are wanted for the renewal of occasional broken down rails between stations, a continuous length of old rails is taken up, next to the neighbouring station, and the good rails picked out of this length are utilised for the renewals, while the bad ones are got rid of. The continuous length so taken up is then filled in with steel rails. Thus, throughout the section, new steel rails are gradually creeping forward from both ends of all stations, and will eventually meet throughout. The system is a well thought out and an economical one, and it ensures the maximum of use being got out of every rail.

7. *Sleepers.*—These are all iron pots, except on bridges or over the crowns of culverts where wooden sleepers are used. The system in force for the opening up of the road, whereby each gang gradually works forward, opening out every part of its section so as to expose sleepers, tie bars and cotters, ought to ensure, and judging by the state of the road does ensure, the early replacement of breakages.

8. *Ballast.*—The road throughout is sand ballasted. The sand is being gradually covered with a skin of broken stone. This is going forward at the rate of 40 to 50 miles annually, and only about 120 miles out of 308 remain to be done. It ought to pay to get it done out of hand, as experience shows that the result is a considerable saving in ballast trains and a setting free of vehicles for traffic use. The absence of dust where the road is covered makes a great difference to the public, for in the uncovered parts the dust is a great annoyance to passengers.

9. *Utilizing the old iron rails.*—I understand that the majority of the old iron rails, which are removed from the road, are but little damaged, except at the ends. They might, with great advantage, have their ends sawn off, the length of a fish-plate hole interval, or otherwise. They ought not, in my opinion, to be sold off, unless at least a very fair price is got for them. Experience on the South Indian Railway, where the old broad gauge iron rails of the 136 miles composing the Negapatam and Erode branches have been run over by metre gauge trains for the last 20 years, shows that, for metre gauge use, such rails have a long life in them and make a very excellent road. Out of the 308 miles of the North-Western section of the Madras Railway, about 113 miles have now been renewed with steel rails. The balance are iron.

10. *Line-clear ticket apparatus.*—At a number of stations where trains may run through without stopping the ticket is handed to the driver by being attached to a hoop of cane which is slung from a sort of gallows. Where the station is on the loop this is not objectionable; but where the station is on the straight the post forming the gallows stands on the platform, four feet from the edge; that is, it infringes standard dimensions. The risk of this leading to accident is really very slight, but such as it is it might, in the majority of cases, be minimized by slinging the little gallows from the projecting station roof instead of standing it on the platform. The post is thus got rid of. The Chief Engineer understands what I mean.

11. *Signal arms.*—I found in several places that signal arms though supposed to fly to danger on release did not do so, or did not quite do so. This should be everywhere seen to.

12. *Standard dimensions.*—At Kosgi, where the station is on a curve said to be of about 5,676 feet radius, the distance from centre of track to edge of platform seems excessive, even allowing for the curve. It measures 6 feet. The road should be slewed if necessary.

13. *Particular stations.*—Heretofore *Ponpadi* has had only an old wagon body for station, but a new station has been sanctioned: there is said to be some delay about obtaining the necessary land. Out of the sanctioned estimate, Rs. 8,000, about Rs. 4,500 is for goods accommodation, but at present only about 4 wagons of goods monthly are said to be dealt with. The station at *Thaduku*, which was opened about 2 years ago, in compliance with local demands, earns only about one rupee daily. It has no approach road, is in a cutting, and there is said by the stationmaster (whose salary absorbs half the earnings), to be no drinking water. It consists of only an old wagon body. It might, I think, be dismantled. At *Rárampéta*, a new entrance is

asked for to the lay-bye from the north end of the through siding to save hand shunting. *Yerragudipad* has heretofore been only an experimental station with a wagon body for accommodation. But it has justified its being converted into a permanent station, and the alterations are now nearly ready. The Company will doubtless make roads inside their boundary to connect their loading bank and booking office with the good district road at the level crossing at north end of station. The station with one lay-bye, low platform, loading bank but no goods shed, and all buildings and without distant signals will cost about Rs. 9,000. The remarks, which I have just made about Yerragudipad, are also applicable to *Kalamalla*, except that here the construction of the new buildings is a bit more forward. *Nangapatnam* has recently been made into a crossing station. *Ragadapalli* is still on its trial with only an old wagon body for accommodation. It has not yet proved itself worthy of better. *Penneru* is a new small station. *Guntakal station.*—This is worked by the Southern Mahratta Railway Company. There are some dangerous hinged wooden flaps on this platform giving access by steps to the rail level below; these ought certainly to be built up; I do not suppose that there is any particular reason to expect that the Guntakal station staff will usually be more decrepit and less able to leap up on their platform than the staff of most other stations in India. At *Molagavalli* the cheap mat structure which during the trial period has served for a station building might now very well be replaced by a permanent structure, and proper houses might be built for the staff. I was told that the traffic there sometimes comes to 20 wagons weekly, and that during last half-year Rs. 8,000 to Rs. 9,000 were received here for goods despatched. An increase in the length of the lay-bye here has already been sanctioned. *Nagarur* is still on its trial with a wagon body for all accommodation. It does not seem likely to justify its being made permanent. At *Kosgi* it would be perfectly easy, and would cost practically nothing if done by the permanent-way gangs, to so slew the approach curves at both ends of the station as to place the station on the main line instead of on the loop, and so avoid the swing of the loop facing points for all halting trains.

14. *Feeder roads.*—I was told that feeder roads to connect the district roads with the railway stations are badly wanted at *Ponpadi*, *Ragadapalli*, *Vandanur* and *Penneru*. Local Boards cannot fairly expect railway administrations to open stations for local convenience unless approach roads are provided.

15. *Annual repairs.*—I did not take the trouble to notice the absence of petty repairs or eye-wash. Indeed, everything looks very clean and tidy. The Chief Engineer who was conducting his own inspection simultaneously with mine will doubtless attend to all that may be necessary. I need only say that I nowhere saw evidence of neglect of ordinary upkeep either of road or works; indeed quite the reverse.

16. *Distant signal arms.*—The Madras Railway is worked on the absolute block system. The Company have officially accepted the General Rules of 1895. Yet their distant semaphore arms are all forked. A perusal of the *proviso* at foot of rule 101, will show that on a line which is worked on the absolute block system a train may not, in anticipation of the lowering of the arm, avail itself of the shelter of the distant signal, a shelter permitted by rule 101 to trains running under systems other than the absolute block, but must wait till the arm is lowered before passing it. Turning back now to rule 72 (*a*) I find it laid down that—

> "Distant signals are signals placed at a considerable distance from the station and shall, except when under the proviso of rule 101 they are used as stop signals, be distinguished by a notched arm."

This would read more clearly thus: "Distant signals may have their arms forked, *except* when used as stop signals under the proviso of rule 101." Or thus: "When under the proviso of rule 101 distants are used as stop signals, their arms must *not* be forked." Thus it is clear that, not having obliterated the forking of the arms of the distant signals at the time of their acceptance of the General Rules of 1895, the Madras Railway Company are contravening those rules.

17. *Dutton's trailable point lock at Puttur.*—In company with the Chief Engineer, and with Mr. Duncan the Acting Telegraph Engineer, who is thoroughly familiar with them, I tried several experiments with an engine on these points. The station facing points and the home and distant signals connected with it, are worked by wire from the station. Under no circumstances is the tongue rail held up against the stock rail by anything more than a tumbling weight. There is at no time a positive lock which would prevent the switch chattering open under a moving train, supposing it to be possible for the vibration of such a train to lift the tumbler weight, which I think extraordinarily unlikely. And yet the unlikelihood is precisely equal to that attaching to any ordinary weighted switch handle giving equal pressure on the tongue rail, no more and no less. The only sense in which the switch can be said to be locked is that when one arm of the home is "off" the stationmaster cannot reverse the switch. It is also locked against the stationmaster by the weight of the wheels of a train on the ordinary locking bar. But it is the tumbler weight, and that only, which keeps the tongue rail up to the stock rail, and at all times the switch can be opened by a crowbar innocuously if both semaphore arms are "on", but releasing one or other of the two disengagers if either arm is "off". When both home arms are "on" the stationmaster can do what he likes with the switch. If when both arms are "on" the switch is sprung over by a crowbar, or is trailed through by an engine, nothing happens; it springs back again when released. But if when one arm is "off", that is, when a train is about to be admitted to the yard, say on the through straight, a shunting engine has the mishap to trail through from the loop, the disengager comes into action, and the switch springs open for the loop, while the arm that was "off" flies to "on". But the station is still safe, for the in-coming train will not enter against signals and the engine which has caused the mischance can only re-enter the yard *viâ* the straight line; the stationmaster is thus apprised of what has happend and goes to set it right before admitting the train. If on the other hand the driver of the shunting engine finds out his mistake before he has got all his wheels off the switch, and tries to back, he *may* get derailed; but this I take it must happen with *any* trailable switch. If, however, he should *not* get derailed and says nothing about it, still all is safe because the in-coming train cannot enter against signals. There is just the chance that the stationmaster, if a fool, may try to remedy things without re-setting the disengager, by pulling off the arm for the loop, which he can do, and so letting the train into the loop and colliding it with the shunting engine. But no system can provide against that sort of thing. I consider that Dutton's system with the trailable lock is just as safe as, and no safer than, any other system for holding a tongue rail up against a stock rail by a weighted lever. Though the weight of the tumbler may most times be practically sufficient against chattering, it *may* fail one time, for it is not a positive lock of the sort considered sufficient to permit through running at speed. The speed of through trains over the points at Puttur must therefore be limited, whether over the straight or the loop, to 15 miles per hour in the facing direction.

18. *The Vandalur installation, South Indian Railway.*—I may add here that since the date of the inspection I carefully examined another instalment of Dutton's trailable switch at Vandalur on the South Indian Railway in company with the chief officials of that Railway. Mr. Stoney also was present. The Vandalur installation differs somewhat from that at Puttur. The points are worked by hand at site instead of by wires from the station, the stationmaster retaining the switch handle until it is necessary to use it. Here too there is no positive lock, the switch being merely held by a weighted lever. There is of course no reason why a sufficiently weighted lever should not bring a pressure to bear on the tongue rail equal to that which would suffice to burst open the ordinary hand-locked bolt. Messrs. Stoney and Winter have invented a most ingenious positive lock which nevertheless can be trailed, at a price of Rs. 80 to Rs. 100; the problem therefore is not insoluble. I agree, however, with Sir A. Rendel that the right way to deal with the very improper practice of trailing through switches is, not to render it innocuous but, to absolutely prohibit it. I therefore do not recommend any further installations in this circle of Dutton & Co.'s trailable switch arrangement.

19. *Saxby and Farmer's hydraulic system at Nagari.*—This refuses to work satisfactorily, doubtless the result of climatic and other local conditions. There is no use in leaving the valuable installation lying around in the yard. It may as well be removed. The points, signals, &c., here are hand-worked. Perhaps, the hydraulic system may be found useful somewhere else under the eye of one of the engineers.

20. *Stoney's system.*—From what I have seen of Mr. E. W. Stoney's, the Company's present Chief Engineer's, very ingenious mechanical devices, I am quite satisfied that what with his "drum" switch handle; his combined rocking lever, switch lock and indicator, price about Rs. 50; his and the late Mr. Winter's positive, but trailable, switch lock, and his improved locking bar,—Mr. Stoney will be able to devise safety appliances which will be not only cheaper but better adapted to the local conditions than, and which will at the same time give all the safety of, better known systems. Mr. Stoney is naturally somewhat reluctant to appear to avail himself of his present position to bring his clever inventions into use. Some of them, however, have long been in use at isolated places on the system and have proved themselves entirely satisfactory. The Company cannot do better than put themselves into Mr. Stoney's hands in this matter. I have little doubt that he can produce a design and an estimate for an installation of safety appliances, at the minor stations particularly where cheapness is a consideration, which will be more satisfactory than most of the numerous systems which for years back have been given an experimental trial on the North-West Section of the Madras Railway.

21. *Engine tires.*—I have frequently been told of difference of opinion between officers of the Engineering and of the Locomotive Departments about the incidence of responsibility for derailments at switches and crossings. The Locomotive Department naturally tries to put the blame on the state of the road, while the Engineers blame the engine tire section. I shall have more to say later on about the design of the switches and crossings. It is obvious that, whether new from store, or newly turned down in the repair lathes, the working side of the engine tires ought always to be identical in section. I examined the system in force at the Locomotive shops at Perambore and feel assured that when tires are sent out of the shops they *are* to proper section. But it is a question whether they are not sometimes neglected too long. The rule is that they must come into the shops when the flange is reduced to $\frac{3}{4}$ inch thick. But more than this is wanted, for long before that time the flange may be in a most dangerous condition and its sharp edge may at any moment mount a facing switch. The orders issued by the Locomotive Superintendent are that, as fast as a knife-edge forms, the engine is to be pinched round at the running sheds, and the edge rounded off by a proper tool. But I saw tires in the shops which had certainly not been so treated, and had I found such a tire implicated in a derailment at a switch, the incidence of responsibility would, in the absence of evidence to the contrary, to my mind have been clear.

22. *Facing points.*—Whether small roadside stations are on the straight or on the loop, fast trains running *through* them will of course keep on the straight. (Indeed I notice that the line-clear-pick-up gallows are always on the straight.) For fast through trains, therefore, the angle of crossing at the facing points of stations is a matter of minor moment. But when a train has to stop at a loop platform, and therefore to get slewed over at the points, it is important that the design of the switches and crossings should be suitable to the speed and to the class of engine in use. The current orders on the Madras Railway are that facing points are not to be run over at a higher speed than 12 miles per hour. But if this order is good for facing points open for the straight, it is certainly not suitable for facing points open for the loop, especially for the 6-wheel-coupled 18-foot-wheelbase engines. Whatever the rules are, engines habitually go over the facing points at considerably higher speeds than 12 miles per hour, as I can vouch for, having often checked it. When entering the loop at this speed the jerk is undoubtedly dangerous. The Company will therefore be well advised to at once arrange to get out all new switches and crossings for a sharper angle, say 1 in 12, and with a longer tongue rail, say 15 feet, and to lay them first in place of all entrance points at stations where the platform is on the loop. One bad smash would pay for most of them. This matter has been brought to a head by the use of vacuum brakes; once in a thousand times it may happen that the brake may fail, and, as happened during the inspection, that the driver may be unable to reduce his speed in time. If this should happen in combination with knife edge wheel flanges, the result would probably be very disastrous. There is a practice in force, so I was told, of inserting a few feet of straight at each crossing, thereby of course sharpening the curve connecting the heel of tongue rail with line of crossing. I do not consider this to be good practice; the use of a smaller crossing angle would be better, for all the radius that can be got is wanted for the 6-wheel coupled engines.

23. *Nandalur Engine Station.*—The substitution of this for Cuddapah is going on as fast as can be arranged. Nandalur works on the one side to Gooty and on the other to Madras. The ghât pusher engines home at Nandalur and turn at Cuddapah. But there are still a few engines homed both at Cuddapah and at Renigunta.

24. *The remodelling of yards.*—The Company are now in possession of a carefully considered set of designs for many stations considered to be in need of remodelling sooner or later. These will form a standard to be gradually worked up to as opportunity offers. But meanwhile much might, I think, be done without extra expense by an organized system of utilizing the permanent-way gangs when ordinary work is slack.

25. *Perambore Locomotive Workshops.*—I inspected this on January 23rd. There is little to notice except, as already complained of, that they are a good deal cramped and will need extensive enlargement unless it is decided to build supplementary shops for the western sections of the system at Podanur. I went carefully into the system in force for the recall from the line of engines and vehicles, and for their partial or full overhaul. The system seemed well designed, and it was, I was assured, being worked up to.

26. *Stores.*—I went into the subject of store balances with the Chief Auditor and Chief Storekeeper, and am of opinion that a special effort might be successfully made to reduce the very heavy balance, Rs. 26 lakhs. The Cannanore extension would appear to afford the opportunity.

Arkonam to Calicut with Bangalore, Kolar, Palghat and Nilgiri Branches.

By Mr. J. C. Lyle, Government Inspector.

27. The inspection was made between the 26th January and the 1st February. The inspection was made concurrently with that of the Company's Chief Engineer. The Resident Engineers and District Traffic Superintendents were present over their respective sections.

28. *Formation.*—Banks and cuttings are well maintained throughout.

29. *Bridges and Culverts.*—The work of strengthening the bridges on the Nilgiri branch by putting in intermediate piers has not been completed yet; the piers are built, but the bedstones have not all been set.

30. *Ballast.*—The work of blinding the sand ballast with stone on the Bangalore branch is progressing. Between Krishnarajapuram and Tyakal a sufficient quantity of stone did not appear to have been collected for this work, the road even where the stone was laid was dusty. Between Malur and Bowringpet on the contrary the sand was well covered and the running in consequence much pleasanter. On the Kolar Gold Fields the sand ballast is in places deficient. Near the west coast where the ballast is sand, the dust at high speeds is very unpleasant.

31. *Rails.*—Most of the steel rails with a large radius of top which gave such bad results in the main line between Jalarpet and Katpadi when run over at high speeds by wheel tires worn by use on the old pattern rail, have been removed and relaid on the Calicut ghat where there is a restriction of speed. The running on these rails appears quite satisfactory so long as the speed does not exceed 40 miles an hour. The running is rough on the old 65 lb. iron rails, owing apparently to the sag which has occurred at the rail joints. Very great care appears to be taken to remove these rails as soon as signs of wearing are observed; many rails which I noticed as marked for removal appeared to have still some months good work in them. As usual the

running on the 84 lb. iron rails between Podanur and Mettuppalaiyam and on the old pattern steel rails was excellent.

32. *Sleepers.*—The road was opened out and examined at several places; both sleepers and fastenings were everywhere found to be in good order. The cast iron pot sleepers, I was informed, corrode much quicker when under cover and generally go first in the goods sheds, the weak point being where the jaw joins the bowl. It also appears that wood ashes affect cast iron sleepers. Steel sleepers appear to corrode quickly wherever they are buried irrespective of the constituents of the covering matter. At Ottapalem station I was shown some iron rails which had been taken out of the line in the goods shed a short time ago, they were completely rusted away.

33. *Fencing.*—Gaps were noticeable in places in the aloe fence where plants had died; the worst section I saw was between miles 220 and 230 where numerous gaps were evidently made use of by the villagers to cross the line.

34. *Stations generally.*—These are clean and well kept all through the line; the convenience and comfort of 3rd class passengers is exceptionally well looked after.

35. *Individual stations—Bangalore City.*—The verandahs have been roofed in, the roof trusses require painting. The platform has now been flagged and a very good job made of it. A tank has been placed on the top of the station, but apparently arrangements for the supply of water have not been made. The new latrine at the west end of the platform has been built up to ground level and houses for subordinate staff had been commenced, but the recent outbreak of plague had completely stopped all work. *Krishnarajapuram.* An aloe fence in the middle of the station yard should be removed. *Tyakal.* Assistant stationmaster's quarters have been sanctioned; but are not yet begun. *Balaghat.* A new loading bank is being built and a siding put in. *Oorgaum.* A level-crossing is stated to be required here. The station running as it does right through a mining property is very cramped for room. Additional waiting accommodation has been given. More quarters are required but work is always slow on account of the difficulty in procuring labour. *Champion.* Here again, the line runs through a mining property and applications for a level-crossing within the station limits have been received. An extra siding is being put in. I noticed the wall of the unloading bank was in a very critical state, also the walls of the 3rd class waiting-room were cracked. These gold field stations are instances of how very expensive in the end it is to do cheap masonry work in the beginning. *Lokur.* The Engineers have not been successful in obtaining a supply of water here. It might be possible to build a reservoir above the station to intercept the drainage from the hills. *Calicut.* An extra room is being added to the stationmaster's quarters which were reported on the last inspection as being small.

36. *Watering arrangements.*—Naturally the present season of the year is not a suitable time for noting the weak points in the water-supply, especially after an excessive monsoon, at all watering stations an abundant supply of water was available. At Whitefield tanks have been erected on a staging of five old screw piles and rails since the last inspection and the water is pumped a distance of about one mile. At Bowringpet the tankhouse has been enlarged.

37. *General.*—The effects of plague and plague restrictions have been to considerably reduce the passenger traffic and to make the punctual running of trains an impossibility.

Remarks by the Senior Government Inspector.

I need add nothing to my own remarks which occupy paragraphs 1 to 26. The attention of the Agent, Madras Railway Company, is invited to the points brought to notice throughout the report, and especially to paragraph 16. The mileage inspected, 849·22 miles, includes the Kolar Gold Fields Railway, 10·00 miles, but excludes the Ennore branch whose inspection will be carried out with that of the East Coast Railway.

Madras,
8th February 1899.

Francis J. E. Spring,
Senior Government Inspector.

Order—No. 232 Ry., dated 24th February 1899.

The report will be forwarded to the Government of India for information. The attention of the Consulting Engineer, Bombay, will be invited to the remarks about Guntakal station in paragraph 13. Paragraphs 17 and 18 will be brought by the Consulting Engineer to the notice of the authorities of the South Indian and His Highness the Nizam's Railways. Orders will issue in the Local and Municipal Department on the remarks made in paragraph 14.

[Here enter No. 233 Ry., dated 24th February 1899.]

(True Extract.)

Francis J. E. Spring,
Joint Secretary.

To the Agent and Manager, Madras Railway.
" Local and Municipal Department.
" Consulting Engineer for Railways, Madras.

Done

Ro. 783 & 7.3.99
Copy forwarded to the agent
S.I.Ry and the Agent and manager
Railway whose attention is drawn to paras 17 & 18
of the Repat

Ro. 789 & 7-3-99

To CE - Bombay

Sir I have the honor to forward herewith a copy of G.O. No. 232 Ry & 24-2-99 communicating the inspection Repat of the Madras Railway for the second half year of 1898 and to invite your attention to the remarks about Guntakal Station in para 13 of the Repat

(Sd) T.C.L.
4-3-99

Exd. W. D'Moss.

75

RAILWAY.

Government {1899} of Madras.

PUBLIC WORKS.

Recd. } 1899. *Enclosures*

Regd. } *Spare copies*

G.O., No. 287 Ry., 13th March 1899.

MARCH.

Report of Inspection of His Highness the Nizam's Guaranteed State Railway

Ordered that the Government Inspector's — for the half-year ending the 31st December 1898, be communicated to the Agent, and a copy of the proceedings forwarded to the Government of India for information.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following paper :—

HIS HIGHNESS THE NIZAM'S GUARANTEED STATE RAILWAY.

STANDARD GAUGE, 5′ 6″.

MILEAGE OPEN FOR TRAFFIC (INCLUDING BEZWADA EXTENSION IN BRITISH TERRITORY 22 MILES) 354 MILES.

Inspection Report for the half-year ending 31*st December* 1898.

1. The inspection was made on February 17th, 18th and 20th in company with the Agent, Chief Engineer and District Engineers over their respective districts.

2. *Formation.*—Banks and cuttings were everywhere in good order and well maintained. Raising of bank between Bonakalu and Chintakani is still in hand. The liberal use which has been made of the ruling gradient (1 in 100) on this line is very noticeable. It is, of course, simply a question of traffic requirements as to whether it would ever prove remunerative to improve the grading.

3. *Bridging—Weak warren girders.*—The warren girders are being removed from the Cogna bridge (15 spans of 60 feet) and replaced by new plate girders. On the completion of this bridge only two bridges, aggregating 11 spans, with the weak warren girders will remain to be replaced. The line is at present carried over the Cogna river on a diversion consisting of 7 spans of 60 feet girders and two of 30. The girders being borne by sleeper cribs about 30 feet high. The cribs are very solidly built up and perfectly safe, provided the work is completed before a flood comes down and it appears certain that the work will be completed before such a contingency is at all likely to happen.

Wyna bridge 8 *spans of* 60 *feet.*—The longitudinal timbers are near the end of their life; they were, when I saw them, in a perfectly safe condition and doubtless their replacement will be taken in hand in the ordinary course of repairs.

Between Bonakalu and Chintakani stations.—A small culvert was being enlarged, meanwhile the line is carried on a diversion with a small temporary bridge, all in very good condition.

Booga bridge mile 265, 3 *spans of* 60 *feet.*—New longitudinal timbers have been put in and the rails are carried on bearing plates.

Mile 257, 8 *spans of* 60 *feet.*—In high floods I understand this bridge has proved incapable of taking all the water safely; last monsoon the water was over the girders. It is intended to increase the waterway by adding arches.

4. *Rails.*—The road all through was in excellent running order; the hammering over the joints on the old rails from Wadi to mile 22 was noticeable, but although we ran over them at a very high speed there was little or no oscillation.

5. *Sleepers.*—About 48 miles of the road are laid on pot sleepers, the rest on pea-pod steel sleepers. The latter appear to suffer very little from corrosion even in station yards. On parts, however, of the Bezwada extension the steel sleepers were corroding very rapidly, and also in the vicinity of ashpits. It appears to be generally accepted now that steel sleepers will not wear well near ashpits and I would be inclined to go further and to say that they are out of place in any station yards in which a shunting engine is in use.

6. *Ballast.*—The ballast consists partly of sand, partly of broken stone and partly of a very excellent kind of gravel, which apparently contains iron in it and in which I am told the steel sleepers wear uncommonly well. Progress is being made in covering the sand with a layer of broken stone; it will, I think prove economical to expedite this work.

7. *Stations—Khammapet.*—The goods-shed here has been extended. *Dornakal junction.*—The re-arrangement of this station is complete with the exception of the crossover road from through siding to first loop line which is waiting for its switches. The new arrangement of the sidings appears to give general satisfaction. At *Hyderabad* the third-class waiting accommodation has been enlarged. At *mile* 111 a new station is in hand, this is rendered necessary owing to the spreading of the Secunderabad suburbs.

8. *Trimulgherry troop siding.*—I understand that this has lately been put in thorough order. I certainly found it in excellent condition.

9. *Yellandu Branch.*—This is in good order. A new weighbridge has been erected but did not appear to have been used as yet. It will certainly be a great convenience having a bridge capable of weighing a fully loaded wagon.

10. *Dutton's interlocking gear.*—This has now been on trial for some time at Golaguda, I was informed that it has given general satisfaction. I explained, however, that we could not consider the facing points as being absolutely locked.

J. C. LYLE,
24th February 1899. Government Inspector of Railways.

Remarks by the Senior Government Inspector of Railways, Madras.

The line is, as usual, in excellent running order. The attention of the Agent is drawn to the remark in paragraph 10.

FRANCIS J. E. SPRING,
24th February 1899. Senior Government Inspector.

ORDER—No. 287 Ry., dated 13th March 1899.

Communicated to the Agent and Manager, His Highness the Nizam's Guaranteed State Railway.

2. A copy of these proceedings will be forwarded for the information of the Government of India.

[Here enter No. 288 Ry., dated 13th March 1899.]

(True Extract.)

FRANCIS J. E. SPRING,
Joint Secretary.

To the Agent and Manager, His Highness the Nizam's Guaranteed State Railway.
„ Resident at Hyderabad, with C.L.
„ Manager, East Coast Railway.
„ Consulting Engineer for Railways.

Exd. S. A. S. Raghaviengar.

Minutes of meeting held at Tollesbury Station on the 8th Feby. 1899 in accordance with the Agent & manager's letter No. 29-5-W of 26th Dec'r. '98 to discuss and report on the working of Dutton's interlocking points and signals and certain objections to the system raised by Sir A. M. Rendel.

"

Present.

Mr. C. B. Dunlop - Chief Engineer
" C. T. George - Loco & Carr. Supdt.
" W. Gard - Dy: Tfc manager.

"

After a careful inspection of the points and signals in question the members of the Committee rescinded the following opinion:-

It appears to us that Sir A. M. Reindel does not consider the use of trailable locks to be an efficient lock in the facing direction.

We agree with him that it diminishes the efficiency of a locked facing point, but Dutton's trailable lock, as far as it has been worked on this Line, has proved satisfactory.

We

we can express no opinion as regards Sayley + Tannen never having seen them.

As regards Dutton's system one advantageous feature is, that, in the event of the points being trailed thro', it results in no damage being caused to any part of the apparatus.

With reference to the paragraph in Sir A. M. Rendel's note regarding Driven's trailing through points contrary to orders we agree with Sir A. Rendel that this is not a sufficient reason for the adoption of trailing points, as in our experience there is no difficulty in making Drivers conform to rules.

We may add that Dutton's system, when erected on our line, provided for the facing points and exit points being set for the same line, before any of the signals could be lowered, thus placing it out of the power of the station masters or signalman to set the exit points improperly for a through train.

This system prevented the station masters from averting a possible collision in

in case 2 crossing trains entered against signals.

The Station master seeing the danger would be powerless to alter the points.

Therefore at our request, Mr. Dutton altered the arrangement so as to enable the station masters to set the facing points at either end of the station for the purpose of admitting one train on the loop, and the other on the main Line.—

(Signed) C. B. Dunlop

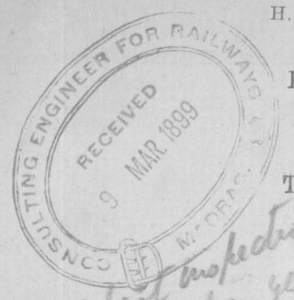
" C. P. George

" W. Gaye

1272/99
1150 G 7-3-99
Am N G S Ry.

P. W. O. No 235-15-7-98-4,000. Form No. Gen. 2.

H. H. THE NIZAM'S GUARANTEED STATE RAILWAYS Co., Ld. 74



From THE AGENT AND MANAGER,
H. H. the Nizam's Guaranteed State Rys. Co., Ld.

To THE Consulting Engineer
for Railways
Madras

Put up last inspection report & say if it has yet gone to India

No 1150 G Dated Secunderabad, (Deccan) 7th March 1899.

ENCLOSURE. Prof. Copy not put up - Sent in 1898 to Gauge & Diameter

REFERENCE.

Sir,

1272
9.3.99

S 59 and ale Scrolls from 55 (in S 65)

With reference to your letter No. 2950 dated 28th October 1898, I have the honor to forward herewith copy of Joint report in the matter of Dutton's points.

I have the honor to be,
Sir,
Your most obed.t Servt,
H Selway
Agent & manager

Form No. :.

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH. 76

Papers to be read in Proceedings:—

182

Again G.O., dated 189 , No.

Again G.O., dated 189 , No

Current No. 1238 of 1898, dated 14th Oct. , from Govt of India

Consulting Engr's Endorsement No 2950, " 1898, " 28th Oct. , to A.M. N.G.S.R.

Letter " 1272 " 1899, " 9th March , from A.M. N.G.S.R. to E.R.

ORDER. No 307. Dy dated 18/3/99

The Govt of India will be addressed

To The Secy to the Govt of India.

Sir.

In forwarding herewith a copy of a joint report by the officers of H.H. N.G. & S.R. on Dutton's interlocking points I am directed to invite your special attention to para 17 of the Senior Govt Inspectors ~~Consulting Engineers~~ report on the Madras Rys for the half year ending 31st Dec. 1898, and to para 10 of the Govt Inspectors report on H.H N.G. & S.R for the same half year forwarded to you under my endorsement No dated 15.3.99

* If approved

Secy to Govt

forwarded to you under X X X X

Proceedings No 233 Ry dy 24.2.99

288 Rys dy 15.3.99.

Form No. 11.

No. 308 Ry 77

Government of Madras,

PUBLIC WORKS DEPARTMENT,

RAILWAY BRANCH.

To

The Secretary to the Government of India,

Public Works Department,

S I M L A.

Madras, the 18th March 1899.

Sir,

In forwarding herewith a copy of a Joint Report by the Officers of His Highness the Nizam's Guaranteed State Railway on Dutton's Trailable Switch 7/11 I am directed to invite your special attention to para 17 of the Senior Government Inspector's Report on the Madras Railway for the half year ending 31st December 1898 forwarded to you under endorsement No. 233 Ry. dated 24th February 1899, and to para 10 of the Government Inspector's Report on His Highness the Nizam's Guaranteed State Railway for the same half-year forwarded to you under my Endorsement No. 288 Ry dated 13th March 1899.

I have the honour to be,

Sir,

Your Most Obedient Servant,

Francis K. Spring

Joint Secretary.

Attached on 18/3/99

Documents accompanying:-

Joint Report referred to.

H.S.