

NORTH EASTERN RAILWAY.

Board of Trade (Railway Department),
8, Richmond Terrace, Whitehall, London, S.W.
29th May, 1913.

SIR,

I HAVE the honour to report for the information of the Board of Trade, in compliance with the Order of the 19th May, the result of my Inquiry into the circumstances under which a portion of a passenger train of the Lancashire and Yorkshire Railway Company left the rails at about 12.43 p.m. on the 16th May, near Castleford, on the York and Normanton main line of the North Eastern Railway.

In this case, as the 12.13 p.m. Lancashire and Yorkshire up express passenger train from York to Manchester, consisting of an engine, tender, and nine vehicles, was running at a high rate of speed between Burton Salmon and Castleford, its rear vehicle left the rails and travelled along the permanent way for a distance of about 568 yards before the train was brought to a stand; just before coming to rest, the derailed vehicle came into contact with the rear vehicles of a mineral train which was standing on the adjoining up independent line.

There were five passengers travelling in the derailed vehicle, and three of these have notified the Company of slight personal injury sustained. Three other passengers, who were travelling in the front portion of the train, also suffered slight injuries. A platelayer in the service of the North Eastern Railway Company, who was at the time sitting on a wheel chock at the end of the up independent line was struck by the derailed vehicle, and was instantaneously killed.

The derailed vehicle, which was an eight-wheeled bogie third class carriage belonging to the Lancashire and Yorkshire Railway Company, suffered considerable damage, and the vehicle immediately in front of it, which was a bogie third class van belonging to the same Company was also slightly damaged. The van and two wagons of the North Eastern mineral train were also damaged.

The engine of the train was a four-wheels-coupled tender engine with a leading bogie and one trailing pair of wheels, and it was running engine first at the time of the accident. It was fitted with the vacuum automatic brake, working blocks on the four coupled wheels and on the trailing wheels of the engine, and on the six wheels of the tender; it was also fitted with a hand brake, working the blocks on the tender wheels.

The train consisted of the following vehicles, attached to the engine in the order given:—

| | | | | | | |
|-----------------------------|-----|-----|-----|-----|-----|-----------|
| 1 N.B. Horse Box | ... | ... | ... | ... | ... | 4 wheels. |
| 2 N.E. Horse Boxes | ... | ... | ... | ... | ... | 4 " |
| 1 N.E. Van | ... | ... | ... | ... | ... | 6 " |
| 1 N.E. Bogie Brake Third | ... | ... | ... | ... | ... | 8 " |
| 1 L. & Y. Bogie Brake Third | ... | ... | ... | ... | ... | 8 " |
| 1 L. & Y. Bogie Composite | ... | ... | ... | ... | ... | 8 " |
| 1 L. & Y. Bogie Brake Third | ... | ... | ... | ... | ... | 8 " |
| 1 L. & Y. Bogie Third | ... | ... | ... | ... | ... | 8 " |

These vehicles were all fitted with the vacuum automatic brake, working blocks on all the wheels except the centre pair of the six-wheeled vehicle. The brakes are all reported to have been in excellent order.

Details of the damage done to rolling stock and to permanent way will be found in the Appendix.

Description.

Fryston North signal-box, near which this derailment took place is situated on the north side of the line between Burton Salmon and Castleford Stations on the North Eastern Railway. The up and down main lines run past the box in directions which are almost exactly east and west, the up line, on which the train concerned in this accident was running, being on the south side. The derailment of the rear vehicle occurred at a point situated 400 yards to the east of the signal-box, and when the train was brought to a stand that vehicle was found to be standing 168 yards to the west of the signal-box.

The line on both sides of the point of derailment is practically straight. There is a bridge over the River Aire, situated 600 yards to the east of the point of derailment, and the gradients for an up train from this bridge are as follows:—

- (1) Level for a distance of 235 yards.
- (2) Rising at a gradient of 1 in 1111 for 100 yards.
- (3) Falling at a gradient of 1 in 377 for 265 yards

From this point onwards, the gradient for an up train is a rising one, varying from 1 in 833 to 1 in 257. It will therefore be noted that the derailment took place near the spot where the gradient changes from a falling to a rising one.

The line is in a cutting, which near the point of derailment is 15 feet deep, and which has gently sloping sides.

At a point situated 234 yards to the east of the signal-box, there are on the up line the trailing points of a cross-over road between the up and down lines, and immediately ahead of these trailing points are facing points leading to an up reception line lying alongside of the up main line.

The permanent way consists of bull-headed steel rails weighing 95 lbs. to the yard and 45 feet in length; the chairs weigh 45 lbs. each, and are secured to the sleepers by two spikes and two trenails; the sleepers are of the usual dimensions, and the ballast is of cinders. The line was relaid in January and March, 1912, and it is at the present time in excellent condition.

No marks which could be connected with this accident were found on the line up to the actual point at which the derailment appears undoubtedly to have taken place. At that point the rails and sleepers for a length of 90 feet were found after the accident to have been shifted bodily in a double curve to a maximum distance of two feet to the left or south of their original positions. Two adjoining pairs of rails had been bent and shifted in this manner, the two corresponding right and left hand rails having in each case shifted together. About 20 yards ahead of these bent rails, wheel marks were found on the left side of each rail, and these continued up to the point where the train was brought to a stand.

All the vehicles of the train, with the exception of the rear one, were found to be coupled together and to be standing correctly on their rails. The rear vehicle, which had clearly fouled the van of the goods train on the up independent line just before coming to rest, was standing upright between the up line and the up independent line with all its wheels derailed; it was uncoupled from the vehicle in front of it, but was standing only a few yards distant from it.

The day on which this accident occurred had been a hot one and there had been a considerable change of temperature, a minimum temperature of 38 degrees and a maximum one of 62 degrees having been recorded in the neighbourhood of this occurrence.

Evidence.

W. H. Cookson, driver, says: I have been 30 years in the service of the Lancashire and Yorkshire Railway Company, and have been a driver for 14 years. I came on duty on the 16th May at 11.10 a.m., to work until 8.10 p.m. I had been off duty previously 10 hours 40 minutes. I was in charge of the engine of the 12.13 p.m. up train from York to Manchester. My engine was a four-wheels-coupled tender passenger engine with a leading bogie and a trailing pair of wheels. It was running engine first at the time of the accident. My engine was fitted with vacuum automatic brakes working blocks on the four coupled wheels, and the trailing wheels of the engine, and on the tender wheels. It was also fitted with a hand brake working blocks on the tender wheels. My brakes were in perfect working order. We started from York at 12.19 p.m., *i.e.*, 6 minutes late. We had not stopped anywhere after leaving York, but we had slackened speed when running through Church Fenton. At Church Fenton I made use of the automatic brake, and it had acted well. Until the accident occurred nothing whatsoever had gone wrong with my train. The first I knew of this accident was feeling a pull on the engine, and this occurred when my engine was just past the Fryston North Signal Box. I estimate my speed at that time at between 55 and 60 miles an hour. I realised at once that something was wrong so I shut off steam. I then saw that my brake was being applied from the rear, so I applied my brake fully. I then looked behind, and saw a cloud of dust in the rear. I then also reversed my engine to assist in stopping the train. The train

then came to a stand. The running of my engine was all right up to the time that I felt the pull on it. The running of my engine did not reveal to me any defect in the permanent way. I cannot throw any light on the cause of this derailment.

Joseph Lockwood, guard, states: I have been 43 years in the service of the Lancashire and Yorkshire Company, and have been a guard for 38 years. I came on duty on the 16th May at 11.45 a.m. to work to 8 p.m. I came off duty the previous day at 8 p.m. I was acting as guard of the 12.13 p.m. train from York to Manchester. My train consisted of the following vehicles attached to the engine in the order given:—

- 1 North British Horse Box 4 wheels.
- 2 North Eastern Horse Boxes, 4 wheels each.
- 1 North Eastern Van 6 wheels.
- 1 North Eastern Bogie third 8 wheels.
- 1 Lanc. & York. Bogie third van, 8 wheels.
- 1 Lanc. & York. Bogie composite, 8 wheels.
- 1 Lanc. & York. Bogie brake third, 8 wheels.
- 1 Lanc. & York. Bogie third, 8 wheels.

My vehicles were fitted with the vacuum automatic brake working blocks on all the wheels, except the centre pair on the six-wheeled vehicle. My brakes were all in good order. I myself was riding in the last vehicle but one of the train. We left York at 12.19 p.m., *i.e.*, six minutes late. Nothing unusual occurred during the journey until this accident happened. The train slackened speed when running through Church Fenton, and at that time the driver appeared to me to have the train well under control. The first I knew of this accident was just before reaching Fryston

North Signal Box, when I heard a rumbling noise under my van. As soon as I heard this rumbling noise I first went to the carriage window and looked out, and I saw the vehicle behind me jumping. As near as I can judge we were about 40 yards from the signal box when I looked out. I at once applied my brake with full force, and I stood there until I saw the vacuum exhausted. Before I looked out of the window my van had begun to oscillate. The vacuum brake acted very well, and the train came to a stand. At the time I applied the vacuum brake it had not been applied from any other part of the train. I then got out to see what had happened. I then found that the vehicle behind me had broken loose and was derailed. It was only standing a few yards from my vehicle. None of the wheels of my vehicle were off the line, but all the wheels of the rear vehicle were off the line. All the wheels were derailed towards the up reception road. None of the vehicles were derailed at all except the rear vehicle. Just before the train came to rest I saw the rear vehicle foul the vehicles of a coal train which was standing in the up reception line. I think that the rear vehicle of my train broke loose when it struck the coal train. The rumbling noise which I heard made me think that there had been some expansion of the rails as I had heard a similar noise on a previous occasion when an expansion had taken place. Until I heard the rumbling noise the vehicle in which I was riding was running quite smoothly.

C. Elleker, signalman, states: I have been nearly 12 years in the service of the North Eastern Railway Company, and have been a signalman just over two years. I am stationed at Fryston North Signal Box, and have been there about a month. I was on duty at the time this accident occurred. At the time the accident occurred I was sitting in the signal box eating my dinner, and the first I knew of the accident was hearing a rattling of the levers in my box. I looked up and saw a cloud of dust. At that time the train was approaching my box, and was about 50 yards away from it. When the train got to my box I saw that the last carriage was off the line. I cannot form any estimate of what speed the train was going when it passed my box. I cannot throw any light on the cause of this derailment. The train passed my signal box at 12.45 p.m. It was due to pass at 12.39 p.m.

Richard Rookes, platelayer, states: I have been nearly seven years in the service of the North Eastern Railway Company, and have been a platelayer all that time. On the 16th May I was travelling in the rear carriage which was derailed. The first I knew of this accident was feeling that my carriage had come off the road. At that time my vehicle was somewhere near the hole which is being dug for the new buffer stops for the colliery siding line. I cannot form any opinion as to what had caused the derailment. I estimate our speed at the time at from 55 to 60 miles an hour. I was knocked from one side of the carriage to the other. My carriage was rocking about. The carriage was dragged along the line for several hundred yards, still rocking, until it came into contact with a brake on the independent line. Our carriage came to a stand then. I was travelling near the centre of the carriage. I cannot say whether it was the rear or the front of the carriage which was derailed. I had not noticed any unusual oscillation in the carriage since the time it left York until I noticed the derailment. It had been running as smoothly as a carriage usually does.

Harry Hardcastle, platelayer, stated: I am a platelayer in the employ of the North Eastern Railway Company, and have been over six years in their employ. On the 16th May I and my brother were engaged tipping material at the siding at Fryston North. My brother was also a platelayer in the employ of the Company. At the time this accident occurred my brother and I had just finished our dinners, and my brother was sitting on the chock and I was sitting on the bank bottom. Before I noticed the express train approaching the engine was past. The first I knew of there being anything wrong with the train was seeing a cloud of dust, and through the dust I could just discern the rear carriage, and as it came towards me it seemed to swing round towards the independent. I myself fell back on to the bank, but my brother was struck by the train. I do not know whether it was only the rear vehicle of the train which was off the line.

C. Middleton, carriage examiner, states: I have been 18 years in the employ of the Lancashire and Yorkshire Railway Company, and have been employed as a carriage examiner all the time. I am now stationed at York, and it was my duty to examine the vehicles of this train before it left York. I did examine them at 11.45 a.m. on that day. I found two vehicles on the train had buffer casting cracks. These vehicles were Nos. 220 and 1534. These defects were not serious enough to interfere with the vehicles running. I myself put two white gum labels on these vehicles to denote that they called for repairs. When the vehicles arrived from Liverpool the previous day they each had green repair labels on. I myself saw these vehicles come in on the previous night. It was on the 14th May that I had the white gum labels put on. It was my mate Harrison who put on the white labels on the 14th. In my opinion both these vehicles were still quite fit to travel.

James Benson, carriage foreman, states: I have been 49 years in the service of the North Eastern Railway Company, and have been a carriage foreman about 30 years. I am now stationed at York. I came down on the day of the accident by the 2.35 p.m. express to examine the vehicles of the train. I examined the two rear vehicles of the train. I did not find anything in the condition of these vehicles which seemed likely to have caused the accident. The wheels were right to gauge, except two of them, which were about one-eighth of an inch out of gauge. I could find nothing in the condition of the vehicles to account for the accident, and I think that the damaged condition of the vehicles could be quite accounted for by a derailment.

J. Isherwood, inspector, states: I have been in the service of the Lancashire and Yorkshire Railway Company about 28 years, and I have been an inspector for 21 years. I examined the damaged vehicles of the train at about 3.30 p.m. on the 16th May. I found the rear coach which had been derailed had been very badly damaged, all its wheels off the road at the time I saw it. I found both bogies very badly damaged, the footboard on one side badly damaged and stripped off, also the body and side lights on one side had been mostly broken. I did not find any defects which would in my opinion have caused the derailment. I think that all the defects in the vehicles had been caused by the derailment. I noticed that the buffer stop on the rear vehicle but one was broken. I do not consider that that could possibly have

caused the derailment. I have been very carefully over the bogies and running parts, and I cannot find anything which would, in my opinion, have contributed to cause the derailment.

Walter Atkinson, inspector, states : I have been in the service of the North Eastern Railway Company 37 years. I am at present permanent way assistant to the district engineer, and have held that position for 27 years. I had been at the scene of this accident on the morning of the 16th May, but I had not made any special examination on that morning of the portion of the line on which this accident occurred. I reached the scene of the accident about 2.20 p.m., and I saw the up line before any alterations had been made to it. I found that the up line nearly opposite the hole which is being dug for the new buffer stops was bulging out about two feet on the up side. Two pair of rails were bulging out, in each case the two rails having shifted together. They were bulging out in a double curve, and they were bulging out about two feet from their former position. From the derailment marks on the rail it appeared that the derailment had taken place about 30 yards on the up side of where the rails were bent, and from that point derailment marks appeared on the line up to the point where the train came to a stand. Up to the facing point crossing I should say four wheels were derailed, and after that I think that eight wheels were derailed. I examined the line on both sides of the bent rails. On the east side of the bent rails I found that the expansion spaces were closed up, and this extended for about 150 yards, and beyond that the expansion spaces were correct, *i.e.*, they were about quarter inch open. It did not appear to me that any of these rails had shifted through the chairs. The bolts on the fish plates in the 150 yards length were screwed up tight. On the west side of the bent rails up to the cross-over between the up and down lines there were also no expansion spaces between the rails, but ahead of that again there were expansion spaces. I formed the opinion that the heat and want of expansion spaces had caused the line to buckle. In other respects I found the permanent way in good order. This portion of the line had been relaid in the early part of 1912. I consider that the bent rails will account for the derailment. There had been sudden heat on the afternoon of the 16th May, and I think that that had caused the expansion spaces to close up. I had not myself noticed these expansion spaces for some time, and I cannot say for certain that there were any spaces that morning. There are colliery workings underneath the line at this point, and we have had previously to lift this line.

Mr. H. J. Rudgard states : I am district engineer of the North Eastern Railway Company in charge of the York District. Some two years ago, owing to the colliery settlement, I gave instructions for the up and down lines at the site of this accident to be raised some two feet in order to equalise the gradient. That was carried out. We found that at this point the level of the line does somewhat alter, but gradually and uniformly. I do not, however, myself contribute this derailment in any way to sinkings connected with the colliery workings.

Thomas Ambler, inspector, states : I have been 23 years in the service of the North Eastern Railway Company, and have been an inspector in the permanent way department seven years. I am now in charge of the section where the accident occurred. I had last examined the line in the neighbourhood of the point where the

derailment took place on the 5th May. I found the line in good condition. I found no defect in the line except slight subsidences. The subsidence was very slight. I did not take any steps in connection with the subsidence as I did not think it was serious enough. The expansion spaces between the rails at that time varied. At a normal temperature the expansion spaces should have been about $\frac{1}{4}$ inch. In some places I found that the space was more than $\frac{1}{4}$ inch, and in no places was it less than $\frac{1}{4}$ inch. We have special instructions to pay particular attention to the expansion spaces in April and October. I did not pay any particular attention to the expansion spaces at this point in April, as I did not consider it necessary. I examined the line again about two hours after the accident. At that time all the expansion spaces were closed up in the eight rail lengths to the east of the crossing of the facing connection leading to the up independent line. I am acquainted with the point where the rails were bent. I did not examine the expansion spaces on the York side of that point. I think it was the heat of that day and the previous day which had caused the expansion spaces to be closed up. Ganger Levitt had charge of this portion of the line under me. He has never made any report to me about these expansion spaces.

James Levitt, ganger, states : I have been in the service of the North Eastern Railway Company 37 years, and have been a ganger for 26 years. I am in charge of the section from Burton Salmon to Fryston North Signal Box, and that includes the scene of this accident. Previous to this accident I had last inspected the line on the evening of Thursday, the 15th May, at about 4 p.m. As far as I could see the line was then all right. I did not find any defects which I thought it necessary to report, and I considered the line was perfectly fit for running. I noticed one point at which the expansion spaces on each rail had closed up. This point was situated closely opposite the up signals. I did not notice any others closed up except these two. I was not paying special attention on that afternoon to these spaces. I cannot say for certain that none of the others were closed up. We have an order that particular attention is to be paid to these expansion spaces in April. I did not make a special examination this last April. I did not examine the line after the accident until the 17th May. I then examined the expansion spaces. I then found that they were all open. At that time the expansion spaces had been altered since the accident.

William Wyard, first lengthman, states : I have been for 29 years in the service of the North Eastern Railway Company, and I have been first lengthman for about eight weeks. I am employed under ganger Levitt. I am ganger Levitt's leading man. I myself examined the line where this accident occurred at about 6.30 a.m. on the day of the accident. I found the line all right. I did not report any defects which I found in it. I did not pay any attention more than usual to the state of the expansion spaces between the rails. I cannot say for certain whether there were any expansion spaces between the rails near the point where the accident occurred at the time when I made my inspection that morning. I am not acquainted with any order that in the month of April the expansion spaces should have special attention. I did not examine the line after the accident, and I cannot, therefore, say anything about the expansion spaces after the accident.

Inspector Atkinson recalled, states : When I visited the scene of the accident on the afternoon

on which it occurred I took a gang of men with me, and immediately after my arrival I set to work to alter the expansion spaces. I found that through a space of 285 yards the spaces required adjustment. Through 15 of these lengths the spaces were entirely filled up, and through the remaining four there were small spaces. Throughout that length I gave an expansion space of $\frac{3}{4}$ of an inch between each pair of rails.

Mr. Rudgard recalled, states : On April 18th, 1907, I issued a circular to all my inspectors instructing them to make a special examination of rail joints in the months of April and October with a view of maintaining sufficient expansion allowance and sufficient freedom of movement of the rail in the fish plate, and as far as I am aware these instructions have been carried out.

Conclusion.

The vehicles of the train to which this accident occurred had all been examined before leaving York that morning, and with the exception of two cracked buffer castings, which had been noted for repair, no defects were found in them. The rear vehicle, which was the only one derailed, had been running quite smoothly up to the actual time of the derailment, and the defects which were subsequently found in it appear undoubtedly to have been the result of the derailment and not the cause of it. There does not therefore appear to be any reason to attribute this derailment to any defect in the rolling stock.

The condition in which the permanent-way was found after the accident will entirely account for the derailment of the rear vehicle. The fact however that the engine and leading vehicles of the train ran past the point at which the rails were displaced without being derailed, and without anything unusual being noted in their running, proves conclusively that the line was not in that condition when the engine and leading vehicles reached it, and that it was only during the passage of the train that the rails shifted into the positions in which they were subsequently found.

The positions in which these rails were found after the accident at once suggested that the shifting of the line had been due to an expansion of the rails under the action of the hot sun which prevailed on that day, and a subsequent examination showed that there were further grounds to confirm that opinion.

Mr. Atkinson, the assistant to the District Engineer, arrived on the spot shortly after the accident, and he at once examined the line on both sides of the point of derailment. He found that on the east or down side of that point there were no expansion spaces at all between the rails for a length of 150 yards, that is for 10 rail lengths ; and that the same condition obtained for a distance of 135 yards, or nine rail lengths, on the west side of that point. There were therefore 19 consecutive rail lengths between which there were no spaces for expansion. Under these conditions, the expansion of these rails under the action of a hot sun would inevitably result in their being forced out of alignment, and this would probably occur, as it did in this case, at the bottom of a dip, where a falling gradient terminated and a rising one commenced.

I have no hesitation therefore in attributing this accident to the fact of the road being forced out of alignment owing to the expansion of the rails by sun heat, combined with the absence of any expansion spaces between them. It is probable that the line was in a strained condition at the time when the train reached it, and that it was the vibration due to the train running over it at a high rate of speed which finally caused it to break out of alignment just before the last vehicle of the train was clear of it.

A very similar accident occurred on the North Eastern Railway about six years ago, and in consequence of that accident the Company issued an order to their staff that, in addition to the attention which was usually given to the matter, a special inspection should be made, both in April and October, with the view to ensuring that sufficient expansion spaces were left between the rails, and that there was sufficient freedom of movement of the rails in the fish plates. The condition in which the line was found after the accident, and the evidence given by the men immediately responsible for its maintenance shows that this order had not been duly attended to this year. Further steps appear therefore to be called for on the part of the Company to ensure that this order is in future strictly complied with.

I have, &c.,
P. G. VON DONOP,
Lieutenant-Colonel, R.E.

The Assistant Secretary,
Railway Department, Board of Trade.

APPENDIX.

DAMAGE TO ROLLING STOCK.

Lancashire and Yorkshire Express Train.

Lancashire and Yorkshire Bogie Third No. 210.—All side panels on one side badly damaged; roof damaged; four side lights, two long footboards, four axle boxes, headstock, one buffer, and vacuum pipe broken; two bogies, four leg irons, gas fittings, brake rigging, and comode handles bent and broken; body of coach badly shaken.

Lancashire and Yorkshire Bogie 3rd Van No. 1534.—One buffer casting and one vacuum pipe broken; one buffer rod and one drawbar bent; one buffer displaced and body shaken.

North Eastern Goods Train.

North Eastern Van No. 34.—End rail, footstep iron, and axle box broken; step iron and hand rails bent.

Davy's Waggon No. 298.—End rail and five planks damaged.

Silkstone and Haigh Moor Waggon No. 32.—Sole, end rail, two quarter boards, and two side boards and door step damaged; drawbar and axle guard bent; two axle boxes and metal brake box broken.

DAMAGE TO PERMANENT WAY.

One Crossing V damaged; 29 P. and C. chairs broken; 364 common chairs broken.

Copies of this Report were sent to the Lancashire and Yorkshire and North-Eastern Companies on the 27th June.

NORTH EASTERN RAILWAY.

Board of Trade, Railway Department,
8, Richmond Terrace, Whitehall, London, S.W.

SIR,

19th July, 1913.

I HAVE the honour to report, for the information of the Board of Trade, in compliance with the instructions contained in your Minute of the 27th June, the result of my inquiry into the circumstances under which a collision occurred at about 12.11 p.m. on the 25th June, between a passenger train and the buffer-stops, at Newcastle Central Station, on the North Eastern Railway.

In this case, as a London and North Western Railway Company's excursion train from Whitehaven to Newcastle, consisting of an engine, tender, and 13 vehicles, was entering the Central Station, Newcastle, on No. 14 platform line, it came into collision with the buffer-stops at the end of that line.

The speed of the train at the time of the collision must have been very low indeed, as the buffer-stops were practically not damaged at all, whilst the engine was so slightly damaged that it was able to run the return journey to Whitehaven with the train.

In spite, however, of the collision being such a slight one, 11 passengers have notified the Company of personal injuries sustained; this relatively large number of injured people being doubtless due to the fact that, as the passengers were just about to alight, they were for the most part standing up.

The engine, which belonged to the London and North Western Railway Company, was a six-wheels-coupled tender engine, and it was running engine first at the time of the collision. It was fitted with a steam brake, working the blocks on the coupled wheels of the engine and on the tender wheels, and with a hand brake, working the blocks on the tender wheels; it was also provided with the vacuum brake apparatus, for working the blocks on the wheels of the vehicles of the train.

The train consisted of the following vehicles, attached to the engine in the order given:—

| | | | |
|-------------------|-----|-----|-----------|
| 1 Bogie Third | ... | ... | 8 wheels. |
| 1 Brake Third | ... | ... | 8 " |
| 1 Bogie Third | ... | ... | 8 " |
| 1 Bogie Saloon | ... | ... | 8 " |
| 1 Saloon | ... | ... | 6 " |
| 5 Thirds | ... | ... | 6 " |
| 1 Brake Third | ... | ... | 6 " |
| 1 Bogie Third | ... | ... | 8 " |
| 1 Brake Composite | ... | ... | 8 " |