Inv-2175

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

PENNSYLVANIA RAILROAD

BAY VIEW, MD.

MAY 28, 1937

INVESTIGATION NO. 2175

SUMMARY

Inv-2175

Railroad:	Pennsylvania.
Date:	May 28, 1937.
Location:	Bay View, Md.
Kind of accident:	Derailment.
Train involved:	Passenger.
Train number:	Second 143.
Engine number:	4806.
Consist:	13 cars.
Speed:	50 m.p.h.
Track:	Initial derailment on tangent and final derailment on 1 degree curve; 0.36 percent ascending grade.
Weather:	Clear.
Time:	10:53 p.m.
Casualties:	30 injured.
Cause:	Broken journal, due to overheating.

July 7, 1937.

To the Commission:

On May 28, 1937, there was a derailment of a passenger train on the Pennsylvania Railroad at Bay View, Md., which resulted in the injury of 27 passengers, 2 dining car employees and 1 employee.

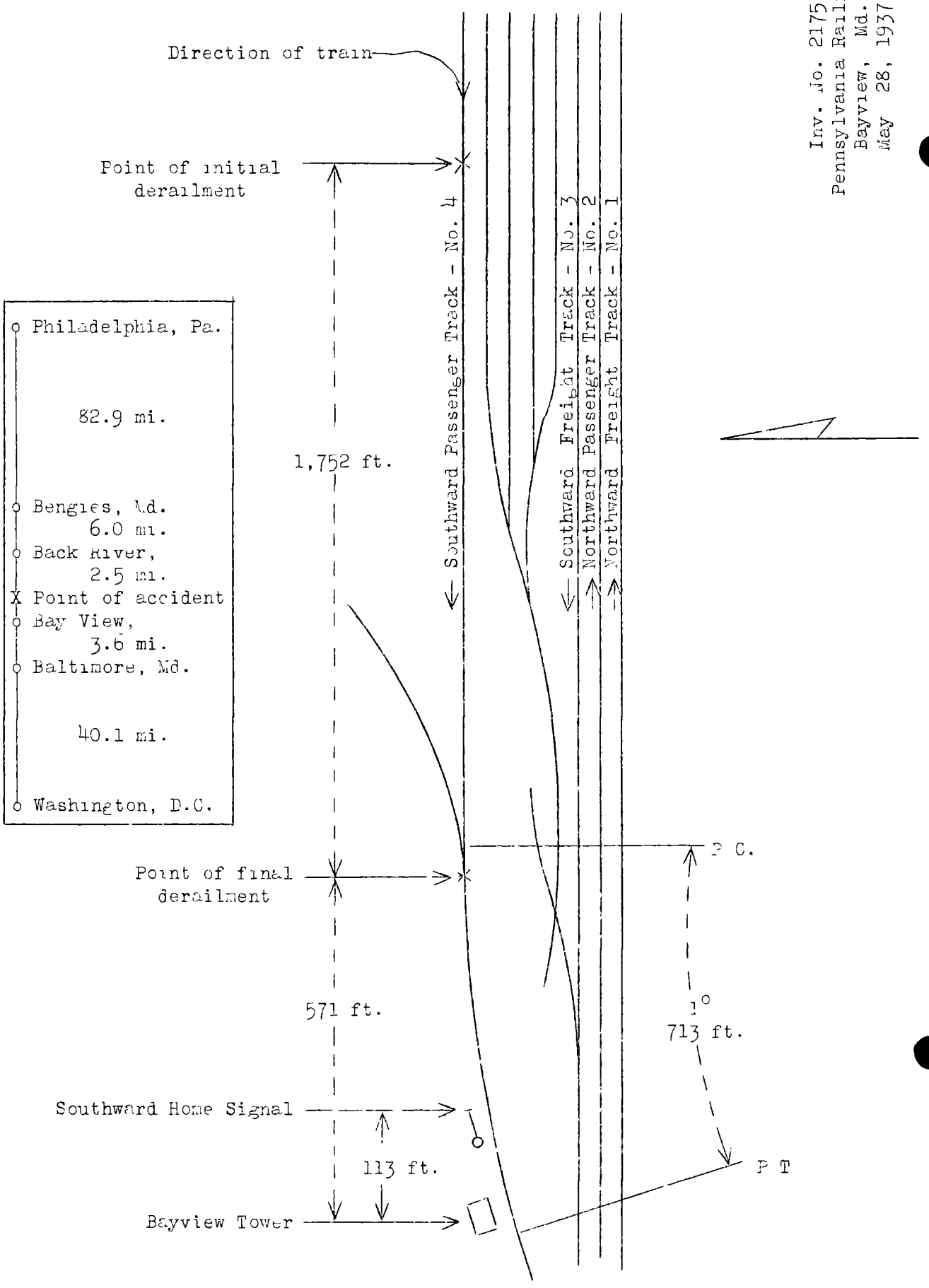
Location and method of operation

This accident occurred on that part of the Baltimore Division which extends between Back River, Md., and Washington, D. C., a distance of 46.2 miles. In the vicinity of the point of accident this is a 4-track line over which trains are operated by timetable, train orders and an automatic block and cab signal system. The tracks, numbered from west to east, are 4, southward passenger; 3, southward freight; 2, northward passenger, and 1, northward freight; in the vicinity of the accident tracks 4 and 3 are separated by yard tracks. The accident occurred on southward passenger track 4, the initial mark of derailment appearing at a point 2,323 feet north of the tower at Bay View while the final derailment occurred 1,752 feet beyond, at a trailing-point switch, leading to the B. & O. interchange track which is located 571 feet from the tower. Approaching the point of accident from the north the track is tangent for a distance of 3,139 feet, followed by a 1 degree curve to the left 713 feet in length; the initial marks of derailment appeared on the tangent track, and the final derailment occurred on the 1 degree curve at a point 21 feet from its northern end. The grade for south-bound trains is generally ascending, being 0.36 percent at the point of accident. The south-bound home signal governing movements on the track involved was located 113 feet north of the tower.

The track is laid with 130-pound rails, 39 feet in length, on an average of 22 treated oak ties to the rail length, with heavy duty tieplates, secured by 2 rail-holding and 2 plate-holding spikes on tangent track and 3 rail-holding spikes on curves; from 6 to 8 rail anchors are used to the rail length. The track is ballasted with 12 inches of rock and 18 inches of cinders beneath the bottom of the ties, and is well maintained. The maximum speed on passenger tracks is 80 miles per hour between Wilmington, Del., and Bay View, Md., a distance of 63.5 miles, 50 miles per hour through the interlocking plant at Bay View, and 60 miles per hour from Bay View to Baltimore, a distance of 3.6 miles.

The weather was clear at the time of the accident, which occurred at 10:53 p.m.

Inv. No. 2175
Pennsylvania Railroad
Bayview, Md.
May 28, 1937



Description

Train Second No. 143, a south-bound passenger train, consisted of 1 combination baggage and mail car, 1 combination baggage and passenger car, 5 coaches, 1 dining car, and 5 coaches, in the order named, all of steel construction, hauled by electric engine 4806, and was in charge of Conductor Mulcahy and Engineman McComas. This train departed from West Yard, Wilmington, Del., at 10:02 p.m., 7 minutes late, passed Bengies, 8.5 miles from Bay View, at 10:45 p.m., 5 minutes late, and was derailed while approaching Bay View Tower at a speed of 50 miles per hour.

The engine and six head cars were not derailed or damaged. The seventh car, the first to be derailed, stopped in an upright position on the roadbed 764 feet beyond the final point of derailment. The next five cars stopped at various angles to the left of the track, leaning at an angle of about 45 degrees, and the rear car stopped in an upright position. The employee injured was the brakeman.

Summary of evidence.

Engineman McComas stated that the air brakes had been tested before leaving the initial terminal and functioned properly en route. Helper McDermott took charge of the engine at Wilmington, and he assumed the fireman's duties, inspecting the engine at various intervals and observing the train from the fireman's side of the cab at various points. The last time he looked back over the train prior to the accident was about 6 or 7 miles from Bay View at which time he observed nothing wrong. On entering Bay View an application of the air brakes was made reducing the speed from 80 to 50 miles per hour and the brakes had just been released when he heard two blasts of the communicating signal whistle and the brakes were applied in emergency.

Helper McDermott stated that after he took charge of the engine he observed the train from the right side at points en route and at no time did he observe anything wrong. The engine was equipped with a speedometer and he noted that it indicated a speed of 78 miles per hour when he shut off the motor and applied the brakes at a point approximately 1 mile north of Bay View. The brakes had been released and the engine was drifting at a speed of 50 miles per hour as indicated by the speedometer when he heard two blasts of the communicating signal whistle, but the brakes were applied in emergency before he had time to take any action.

Conductor Mulcahy stated that he looked out and inspected the train at Perryville and again at Middle River, located 32.6

and 6.7 miles, respectively, north of Bay View. He could clearly see the entire length of the train and he did not see any fire or sparks nor did he detect any odor indicating a hot journal. The last inspection was made about 6 minutes prior to the accident, at which time he was at the third car from the rear. Approaching Bay View he was standing in the sixth car when he saw the car to the rear wabbling and a dining car waiter came running toward him waving his hands. Conductor Mulcahy immediately opened the emergency valve.

Head Brakeman Biddison stated that in the vicinity of Principio, 34.8 miles from Bay View, he made an inspection of the train on both sides from between the sixth and seventh cars. On approaching the point of accident he was in the sixth car, and noting the alarm given by the dining car waiter he immediately pulled the communicating signal cord and started toward the emergency valve, but was thrown to the floor by the emergency application of the brakes, caused by the conductor having already opened the emergency valve.

Flagman Pearl stated that he was in the rear car most of the time after leaving Wilmington and inspected the train at several points en route and at no time did he notice anything wrong. The statements of Baggagemaster Lore and Assistant Baggagemaster Stryker brought out nothing additional of importance.

Highway Crossing Watchman McFadden, at Chase, Md., 11.1 miles from Bay View, stated that shortly after his arrival at the crossing about 10:32 p. m. he saw a blazing hot box on the fireman's side in the middle of a passing train. He immediately reported the fact by telephone to the operator at Gunpow, 12.7 miles from Bay View, but was not sure that he had described it as a blazing hot box. He also stated that he had intended calling the operator at Bengies, but had momentarily forgotten the number and on ringing once was answered by the operator at Gunpow.

Operator Rollings, at Gunpow, stated that his tower is located on the fireman's side of south-bound trains, and he observed Train Second No. 143 as it passed at 10:42 p.m. and did not see anything wrong. Crossing Watchman McFadden called him at 10:44 p. m., reporting a hot box, but the operator was unable to recall whether or not the watchman had said the hot box was bad or blazing. On his way home about 11:30 p. m. he talked with the watchman and at that time received information that the blaze was coming from around the journal. Operator Rollins further stated that immediately after the receipt of the report, he called the operator at Bengies and told him to look for a hot box and to notify Baltimore.

Operator Shoff, whose tower is located west of the track at Bengies, 8.5 miles from Bay View, stated that when he received the report of the hot box from the operator at Gunpow the train was about 50 yards from the tower; he went over to the door but did not see anything wrong as the train passed. He immediately called the operator at Bay View and also the dispatcher, and reported the hot box at about 10:45 p. m.

Operator Howard, at Bay View, stated that when he received the report from the operator at Bengies, he called the dispatcher to ask if he should stop the train and the dispatcher instructed him to let the train proceed to Baltimore. He stated that on receiving a report of this kind it is the general practice to give the train a signal indicating a hot box and to notify the dispatcher, but inasmuch as the dispatcher had instructed him to let the train proceed he did not intend to signal Train Second No. 143. He thought that 6 or 7 minutes elapsed between the time he received the report of the hot box and the time of the accident.

Dispatcher Cunningham, at Baltimore, stated that inasmuch as the hot box on Train Second No. 143 was not reported as being bad, he considered it all right to let the train proceed to Baltimore without stopping for an examination. When hot boxes are reported at stations immediately adjacent to a terminal, unless the box is reported as being bad, it is the practice to have the train proceed to the terminal where a car inspector examines it, and he had made arrangements to have the hot box on Train Second No. 143 examined on its arrival at Baltimore. He has handled several hundred hot boxes on passenger trains in the past and if a hot box is reported he instructs the operator to observe it and, if it appears necessary, the train is stopped at the first available point. There have been numerous cases where hot boxes have been reported and it later developed that it was nothing more than fire flying from a brake shoe; therefore he does not stop a train unless the hot box is reported as being bad.

Master Mechanic Cover stated that he arrived at the scene about 2½ hours after the occurrence of the accident and on inspecting the derailed equipment on the right or west side he could find nothing wrong. The first car to be derailed, coach 3298, was leaning toward the left with the trucks buried, and after this car had been restored to an upright position he inspected the left side and found that the L-4 journal box on the lead wheel of the trailing truck was hot. Removal of the cover disclosed that the journal was broken off inside

the box. This journal box is known as an Isothermos box and the mechanical parts that function to provide lubrication were intact, and there was nothing defective in the arrangement; approximately 1 inch of oil remained in the oil well of the box. The journal had broken off at a point about 8¼ inches from the collar end and was reduced in size approximately 1/2 inch at the point of breakage. There was no trace of lining-metal left in the box and the brass was broken in several pieces. After the break occurred, the stub end of the axle had burned its way upward through the back of the box, so that the box was riding on the truck pedestal and the wheel was free to go in any direction. Master Mechanic Cover had the box lid removed from the R-3 journal box, but found no evidence of anything wrong in this box, and there was approximately 1½ inches of oil in the well. Subsequent examination of this box, after the wheels were removed from the truck in Canton Shop, showed that 1½ inches of the bearing lining had broken loose at the fillet end of the journal, and this he attributed to the wheel carrying excessive weight after the failure of the axle. It was his opinion that this failure was caused by the lining-metal of the bearing located in the L-4 box, pulling or slipping sufficiently to foul the two oil openings in the bearing. The normal height of the oil in the oil reservoir is 2 7/8 inches.

Inspector Perry, of the Test Department at Altoona, stated that he is regularly assigned to the work of maintaining Isothermos journal boxes, which are standard equipment for coach 3298. A new pair of wheels was installed on this car at Washington, D. C., on May 27, and he applied the Isothermos boxes and parts on these wheels which were to be placed in positions 3 and 4. The journals and all parts of the oil box assembly were examined and cleaned and with the exception of new dust guards applied to both boxes and a new bearing fitted to the No. 4 journal, the original Isothermos parts were replaced. He noted that the oil holes in the new bearing were not fouled, and he placed sufficient oil on both bearings to lubricate them until the revolving dipper would function. The oil retaining rings were on the journals when the wheels were received at Washington and he noted that they were tight, that the entire Isothermos assembly on both journals was in proper condition and correctly applied, and that oil of the proper quality was supplied to the boxes in sufficient quantity. Inspector Perry said he inspected the No. 4 journal after the accident, but was unable to give an opinion as to the reason for overheating.

Foreman Car Shops Keefe, at Washington Terminal, stated that he was present when the wheels were applied to car 3298, and was satisfied that the car was in proper condition when

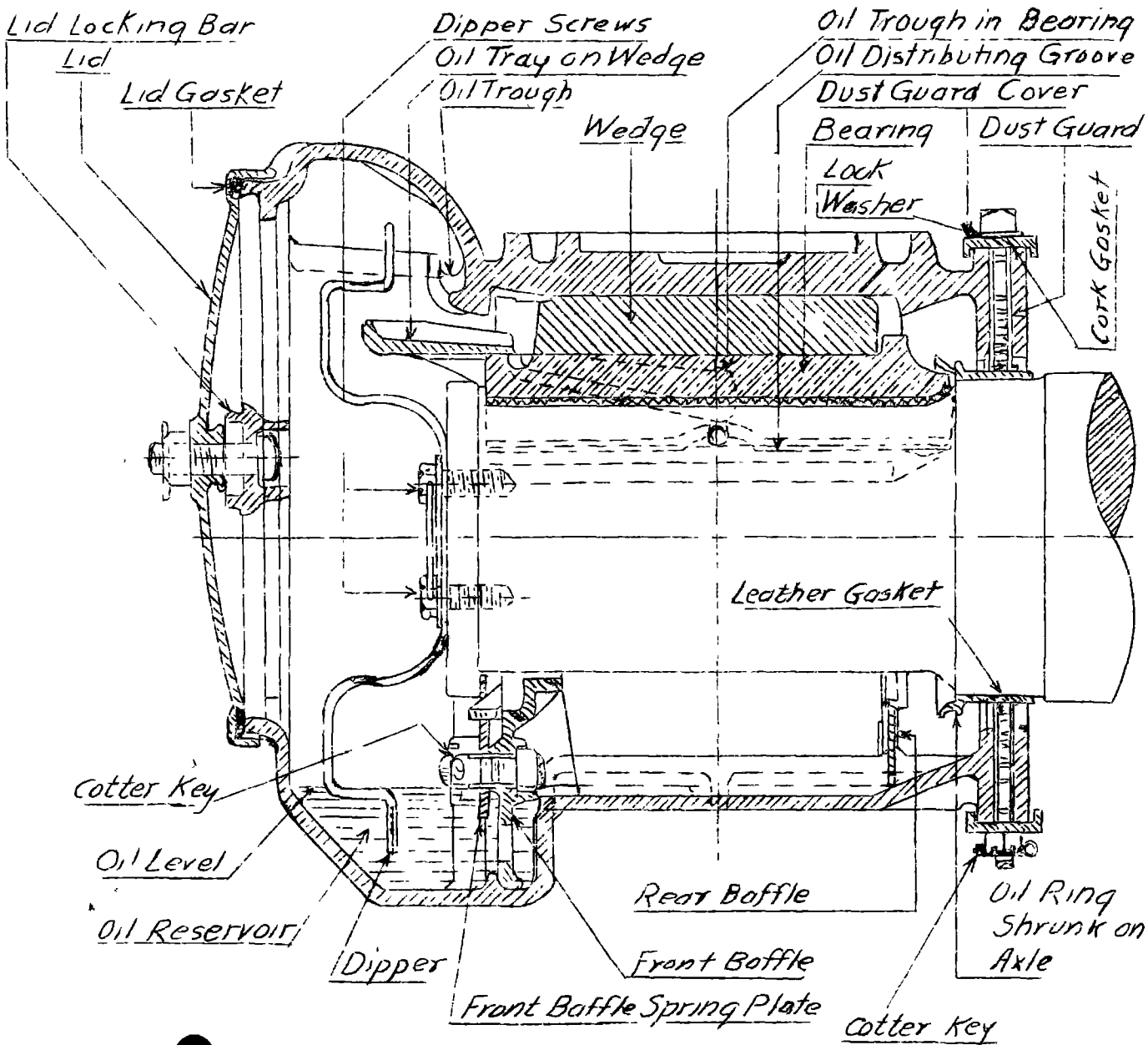
dispatched from that point. He also stated that he had never experienced any trouble with Isothermos journal boxes.

Car Inspector Dylevsky, at Sunnyside Yard, Long Island, N. Y., stated that he inspected the equipment of Train No. 128 on its arrival on May 28 and this train included car 3298 which was later dispatched in Train Second No. 143. There was no indication of overheating of the journal boxes, and the last oiling date marked on this car was May 27, 1937.

Gang Foreman Car Inspectors Gray, at Sunnyside Yard, Long Island, N. Y., stated that he had received a report from the conductor of Train No. 128 that the trucks under car 3298 were noisy. He made a personal inspection of these trucks and found nothing wrong and permitted this car to be dispatched in Train Second No. 143.

The car involved, P. R. R. coach 3298, was built subsequent to the year 1926, weighs 132,000 pounds and is equipped with trucks of the four-wheel type, having one piece Commonwealth cast steel truck frames provided with cast steel bolsters under which are mounted four-section full-elliptic springs on each side with additional coil springs mounted on each end of truck equalizers. The wheels are of wrought steel, 36 inches in diameter with 5½ by 10 inch journals; the journal boxes, which are manufactured by the National Malleable and Steel Casting Company, are known as Isothermos journal boxes. On the Pennsylvania Railroad the pedestal locations on passenger cars are designated from the "B" end as Nos. 2-4-6 and 8 on the right side and Nos. 1-3-5 and 7 on the left side.

The Isothermos journal box is designed to accomplish lubrication by means of a continuous flow of free oil to the bearing surfaces, thus eliminating the necessity of waste packing; it employs a bearing of the conventional type adapted for use in this particular system. The oil reservoir which has a capacity of about six pints, is located at the bottom of the box, and a metal stamping called a dipper, which is securely attached to the end of the journal by two studs, is used to convey the oil to the top of the box. The wedge inserted between the bearing and the top of the box is of the usual type except that a wide lip, called the wedge tray, which extends beyond the end of the journal, is cast on its outer edge to collect the oil delivered to the top of the box by the dipper. The slope of the floor of this tray causes the oil to drain through a hole in the wedge into channels in the top of the bearing which direct the oil to holes on each side of the bearing through which it flows to longitudinal grooves on the underside of the bearing where it is delivered to the journal. The edges of the underside of the bearing are broadly chamfered to form a secondary reservoir for oil held in suspension between the edge of bearing contact and the point of



ISOTHERMOS

JOURNAL

BOX

oil delivery. At low speed the oil carried to the top of the box by the dipper falls from the dipper to the tray, while at high speed the dipper casts the oil to the top of the box from where it drains to the tray. The front of the box is hermetically sealed by a cover plate bolted against a cork gasket, and a filling plug is provided for inspection of the oil level and replenishment of the oil supply. The rear end of the box is sealed against leakage by a steel oil-retaining ring, shrunk on the axle, which by centrifugal force returns any oil reaching it to the reservoir, and by a dust guard which fits closely against the oil retaining ring. Tests made by the manufacturer indicate that with oil at a temperature ranging between 128 degrees and 136 degrees, oil will be delivered to the bearing at the rate of about 50 pints per hour when the speed is 50 miles per hour, and at 80 miles per hour the rate of delivery will be about 92 pints per hour.

Inspection of the oil level in the box is required every 7 days, and an oil examination with the cover removed is required every 30 days, at which time a metal tag is fastened to the box cover, showing the date of examination.

Examination of the burned off journal was made by the Commission's inspectors. The journal showed indications of intense heat about 2½ inches from the fillet end. The stub of the collar-end was burned to a cinder through to the center, while the fillet-end showed signs of being twisted to a cone, beginning at a point 2¼ inches from fillet. The journal brass was badly burned and broken in numerous pieces, and all of the bearing metal was missing. The wedge was badly burned on the inside end, the journal box had fused at the junction of the top and rear wall, and the oil retaining ring had been melted through at the top and was welded to the back wall. There were no indications of cracks in the journal box. The journal box cover was in position, intact, and with cork gasket in place; the oil dipper although slightly bent, was secured to the stub end of the journal. The No. 3 journal brass had the bearing metal worn down to the brass on the inside or fillet-end of the brass a distance 2 1/8 inches, apparently caused by the shifting of weight to the No. 3 after failure of the No. 4 journal.

Inspection of the track showed the first mark of derailment to be a light flange mark on a tie plate at a point 6½ inches east of the gauge side of the west rail. Proceeding southward at a slight angle toward the east, this mark appeared on top of each tie for a distance of 90½ feet growing heavier as it progressed and at that point it was 18 inches east of the gauge side of the west rail. From there it paralleled the rail southward for a distance of 1,661 feet to the

lead rail of the B. & O. interchange track where the final derailment occurred. There was a light skidmark on the top of the west rail extending from the outside of the head at the initial mark of derailment diagonally across the top of the rail for a distance of 51 feet to the gauge side. This mark was evidently made by the lower portion of the truck when the No. 4 journal failed and the wheels became derailed. At a point 54 feet south of the initial mark of derailment a very light flange mark on top of the tie appeared 14 inches to the east of the east rail, and six other ties similarly marked were found at intervals within a distance of 142½ feet.

A report of the engineer of tests, covering this failed journal, states that the axle was burned off about 2½ inches from the fillet and showed the typical cone shape characteristic of burned axles. Both the wedge and the bearing were in bad condition as the result of heating and pounding, but it was evident that both had been in their proper positions before the accident. There was only one oil hole in the portion of the bearing still left, but this hole was still open. The dipper was slightly bent, but the wreck crew had found it in place with the retaining wire through the bolt heads. It is evident that the condition of the dipper had no responsibility for the accident. The oil retaining ring and the dust guard were destroyed; the journal box had a hole burned in the top by the axle; the cork gasket of the front lid was charred but had evidently been in proper position. The front baffle plate was in position and undamaged except that the small bronze wearing surface at its top was missing, probably as a result of the accident.

Pedestal 3 bearing at the opposite end of the axle, had been wiped, probably as a result of the heavy load and hammer blows following failure of the mate box. The wedge, dipper, and baffle plates were in good condition. The oil retaining ring was in place but could be removed without heating. It was cut and badly pounded on the outside and there was no definite evidence that it was loose prior to the accident. The oil in the box was low, but it probably drained through the dust-guard seat when the car was leaning toward the left. The front lid and dust guard were in satisfactory condition.

In conclusion the report states that there is no direct evidence that there was any defect in the Isothermos journal box assembly at pedestal 4 which was responsible for the heating of the journal. There is, however, direct evidence that the heating was not due to broken dipper, baffle plate or wedge plate out of place, leaking lid gasket, or dirty oil. In spite of the lack of direct evidence, it is possible that the heating was due to loss of oil caused by a loose oil ring.

A report dated April 27, 1937, shows that there have been four hot boxes attributed to this cause, and in addition, there was one instance where an unusual loss of oil was traced to a loose oil ring. It was not possible, however, to definitely assign a reason for the hot box on car 3298.

Discussion

The investigation developed that the journal on the left or east side of the front axle of the rear truck of P.R.R. coach 3298, the seventh car in the train, was broken off, due to having been overheated, but it was impossible to determine the cause. On the day preceding the accident a pair of new wheels was installed at this axle location and the original Isothermos journal boxes were used, except that new dust guards were provided in each journal box and a new bearing was applied on the No. 4 journal involved. All applied parts had been examined and cleaned before being installed and were in proper condition, and the proper amount and quality of oil was in the boxes. This coach was then moved to New York City, a distance of 227 miles, where it was reported by the conductor as having noisy trucks. Both the gang foreman and the car inspector inspected the trucks but could find no defect. This car was then dispatched southward in Train Second No. 143, and although the entire crew inspected the moving train at various points en route, nothing unusual was noted and none was aware of the hot journal until after the accident.

The hot journal was discovered by a highway crossing watchman at Chase, 11.1 miles from Bay View, who immediately reported it. The operator at Bengies, 8.5 miles from Bay View, received the report as the train was approaching his tower. He immediately notified the operator at Bay View and the dispatcher at Baltimore, this being about 10:45 p. m. The dispatcher, however, instructed the operator at Bay View not to stop the train, but to let it proceed to Baltimore, and justified his action by stating that when a hot box is reported at a station immediately adjacent to a terminal, the train is allowed to proceed to the terminal for examination by the car inspector unless the report states that it is a bad hot box; when the report indicates that the hot box is a bad one the train is stopped at the first point possible. Bengies, from which the hot journal was reported, could not be considered immediately adjacent to the Baltimore station as the distance is 12.1 miles, and a journal which is sufficiently overheated to attract attention by responsible employees, is a hazard and this is especially true when on a train running at a speed of 80 miles per hour. The safety of the train demanded that

it be stopped for inspection at the first available point. Approximately 6 minutes elapsed between the time the operator at Bay View received the report of the hot journal and the time of the accident, a sufficient time in which to have placed the home signal in the stop position. This signal was located 458 feet south of the point of accident and if the train had been brought to a stop immediately north of the signal, the derailed rear truck of the seventh car would have stopped north of the B. & O. interchange track switch, and the general derailment would not have occurred.

Conclusion

This accident was caused by a broken journal, due to overheating; the cause of overheating could not be determined.

Respectfully submitted,

W. J. PATTERSON,

Director.