Inv-2326

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

BALTIMORE & OHIO RAILROAD

BROAD FORD, PA.

DECEMBER 16, 1938

INVESTIGATION NO. 2326

SUMMARY

Inv-2326

Railroad:	Baltimore & Ohio
Date:	December 16, 1938
Location:	Broad Ford, Pa.
Kind of accident:	Fire in baggage-express car
Train involved:	Express
Train number:	32
Engine number:	5094
Consist:	11 cars
Speed:	40 m.p.h.
Operation:	Timetable, train orders and automatic block-signal system
Track:	Double; series of curves and short tangents; grade generally ascending eastward
Weather:	Clear, cold
Time:	5:36 p. m.
Casualties:	1 killed; 1 injured
Cause:	Fire in baggage-express car due to improper operation of oil-lamp equipment, inaccessibility of end doors as means of egress, due to lading, and failure of train signal system and the emergency valve to function

To the Commission:

On December 16, 1938, there was a fire in an express car handled in a first-class train on the Baltimore & Ohio Railroad near Broad Ford, Pa., which resulted in the death of one railway express messenger on duty, and the injury of one railway express employee who was deadheading.

Location and Method of Operation

This accident occurred on that part of the Pittsburgh Division designated as the River Sub-Division which extends between Pittsburgh and Connellsville, Pa., a distance of 57.8 miles. In the vicinity of the point of accident this is a double-track line over which trains are operated by timetable, train orders and an automatic block-signal system. The accident occurred in the vicinity of Broad Ford. Approaching from the west the tracks parallel the north bank of the Youghiogheny River and consist of a series of curves and short tangents. The grade is generally ascending eastward, the maximum gradient being 0.47 percent.

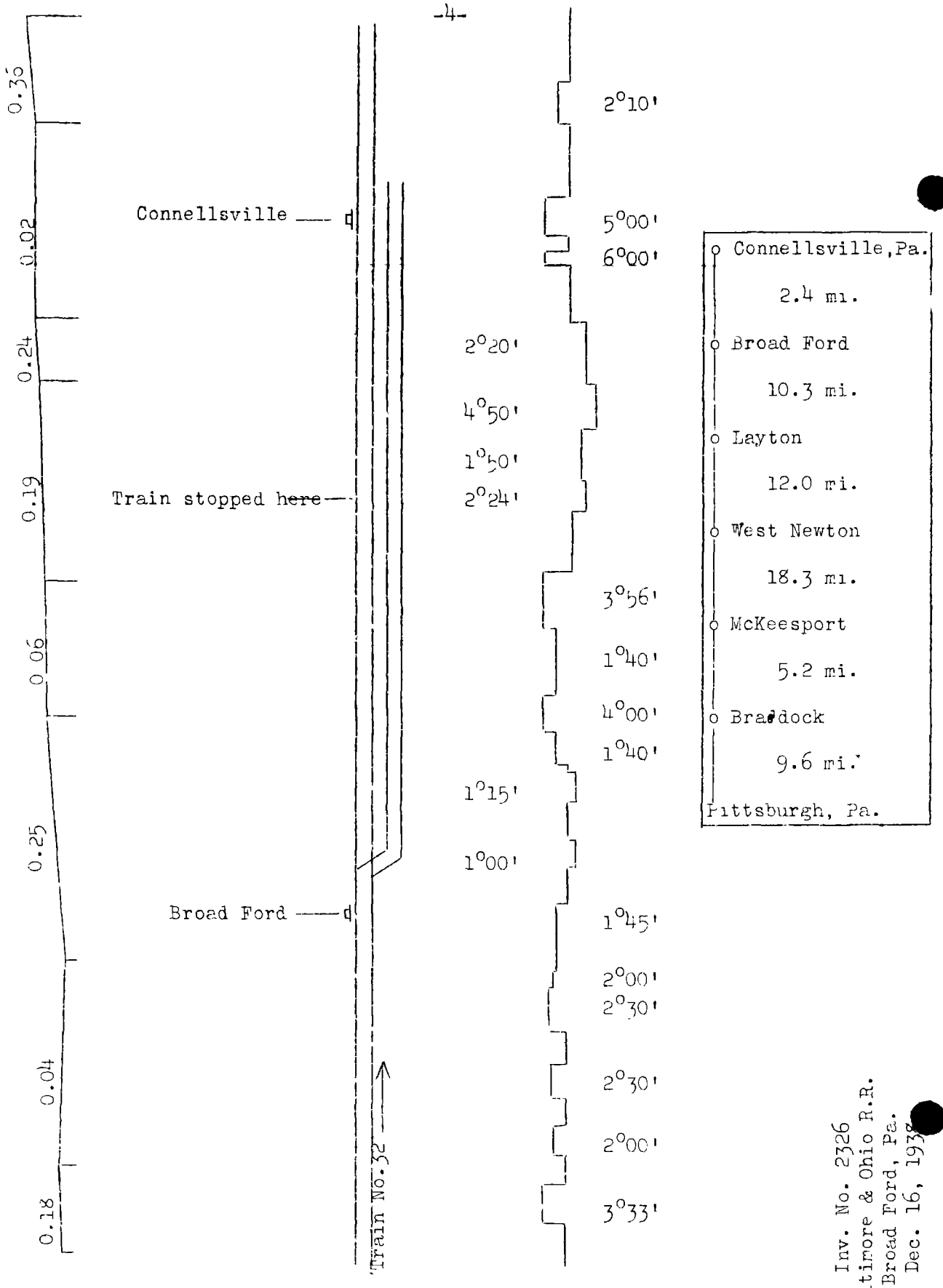
Under Section No. 2, Instructions Governing Inspection and Maintenance of Air Brakes and Air Signal Equipment on Passenger Equipment Cars, Rule 6 reads in part as follows:

> 6. Inspectors should pull signal cords in each car to insure that car discharge valves open and close properly, and have not been cut out for any reason. Also, test Conductor's valves by pulling cords in all cars ***. It should be noted that both green and red cords, leading to car discharge and Conductor's valves, are free from knots, properly run over pulleys, and of sufficient length to avoid trouble from shrinkage in damp weather.

The weather was clear and cold and it was dusk at the time of the accident, which occurred about 5:36 p. m.

Description

No. 32, an east-bound first-class train, consisted of two refrigerator cars, one express car, one refrigerator car, four baggage cars, one coach, and two refrigerator cars, in the order named, hauled by engine 5094, and was in charge of Conductor Leiberger and Engineman McLalan. This train left Pittsburgh at 4:18 p. m., 2 hours 18 minutes late, made stops en route, and passed Broad Ford, 55.4 miles beyond, at 5:35 p. m., according



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to the train sheet, 2 hours 9 minutes late. Shortly thereafter it was discovered that the third car, Pere Marquette express car 472, was afire, and the flames had driven the two occupants out of the car and forced them to stand on the sill step located under the front door on the left side of the train and to hold to the handhold alongside the door. The speed was then about 40 m.p.h. and the engineman made a service air-brake application, but before the train stopped the express messenger lost his hold, fell to the ground and was killed. The railway express employee who was deadheading managed to hold his position on the sill step until the train stopped but he suffered injury; the car was considerably damaged by fire.

Summary of Evidence

Superintendent Howes, of the B. & O., stated that No. 32 departed from Pittsburgh at 4:18 p. m., 2 hours 18 minutes late, with 11 cars, the third car in the train, P.M. 472, was being used as a messenger car on account of the regular messenger car that came out of Chicago having been set off in bad order at Barberton. P.M. 472 is a regular car on No. 32 and is known as the Detroit-Jersey City storage car. This car normally moves under seal and is worked only at Toledo, Deshler, Pittsburgh and Cumberland, hence there is little necessity for lights in this car. On this particular date P.M. 472 arrived at Pittsburgh under Railway Express Agency seals and at Pittsburgh these seals were broken and the use of this car as a messenger car east of Pittsburgh was authorized by the Railway Express Agency at Pittsburgh.

Depot Agent Thomas, of the Railway Express Agency, B. & O. station, Pittsburgh, Pa., stated that between 1:30 and 2 p.m. on December 16, he received advice that the messenger car in No. 32 had been set out on account of a damaged coupler. He made no effort to obtain a replacement car from the railroad company but decided to use P.M. 472, which was already in No. 32, as messenger car eastward from Pittsburgh with Express Messenger Owens, the regular messenger, in charge. No. 32 arrived in Pittsburgh at 5:25 p. m. and after some switching, which consumed about 12 minutes, P.M. 472 was made available to the express company on station track 4. In order to make room for local express loading, 8 truckloads of through express were transferred to another car but part of the space thus provided was taken up by about 2½ truckloads of local express which were placed in the car. None of the lading consisted of explosive or inflammable material. Owens made no objection to the use of P.M. 472 as messenger car, but he did ask for a hand lantern and was given a B. & O. trainman's old lamp which was kept in the office for use in emergencies. Owens cleaned the lamp, filled it with oil, and took it to the car with him. When No. 32 left Pittsburgh at 4:17 p.m. the east end of the car was loaded to the roof across the entire width of the car and this lading

extended west to the edge of the side doors. About one truckload of express was in the west end of the car but this was placed across the entire width of the car, thus blocking the end door at that end. The space between the side doors on the north side of the car was loaded to the roof for about one-third of the width of the car. All side doors were clear and unfastened. The Railway Express Agency has not issued any book of rules covering loading requirements, but circulars containing loading instructions are put out from time to time. There is no strict rule requiring that end doors in messenger cars be kept free, but it is usual to maintain a passage to the end doors in such cars. Messengers are instructed with regard to the use of fire extinguishers, but not concerning any other car device.

Martin Egan, employed as a driver in the vehicle department of the Railway Express Agency, stated that when he boarded P.M. car 472 at McKeesport to deadhead to Connellsville, Express-Messenger Owens was separating express by the light of a hand lantern. Shortly after leaving West Newton, 18.3 miles east of McKeesport, this hand lantern broke into flames and after Egan had opened the south rear door Owens threw the blazing lantern from the car. About 5 or 10 minutes later Owens lighted the oil-burning middle ceiling-lamp, but in a few minutes this lamp also became enveloped in flames and was extinguished by the messenger who turned down the wick. Egan then went to sleep but a short time later he was awakened when Owens lighted the oil-burning ceiling-lamp at the west end of the car. Shortly afterwards, when the train was just west of Layton, this lamp also burst into flames. Owens turned down the wick and attempted to extinguish the fire by batting it down with paper but the blaze spread to the roof and in about 5 minutes was out of control. Egan then pulled the signal cord, located on the north side of the car, and although he gave several pulls, some long and some short, and heard air escaping there seemed to be no response to his signal; he then moved across the car and pulled the emergency cord with both hands, using considerable force. No exhaust of air resulted from his efforts and there was no application of the train brakes. He and Owens then left the car through the east door on the north side and stood on the sill step located below the door. Owens was on the top step and Egan on the bottom step and both were holding to the handhold located alongside the door. Egan closed the door as much as he was able but there was still enough opening to subject them to heat and flames. After some little time Owens lost his hold and fell from the train, and a short time later the train stopped. Egan said that at the time fire broke out both end doors were blocked by express; the east door on the south side was blocked by a large crate and there was considerable merchandise against the west door on the north side, but none of the express was piled as high as the signal and emergency cord brackets. He was of the opinion that the oil container of the lamp did not explode, and he stated that there was no gaseous odor present at the time of the fire. He was unable to

say whether the car was equipped with fire extinguishers, but observed that there was no burlap wrapped around the lamps. The temperature was above the freezing point.

Engineman McLalan stated that the air brakes and the train air-signal system were given a terminal test at Pittsburgh and both operated properly. These devices also functioned properly during the three station stops made prior to the accident, but numerous blasts, both short and long, of the cab air whistle occurred between stations at times when the train was moving around curves. Although such false signals are not unusual during most trips, he looked back for hand signals when each was received. Prior to the stop incident to the fire, the last air signal was received when the engine was just east of Old Florence Mine cross-over. As usual, he looked back for a hand signal but did not receive any. Approaching Broad Ford he received a green signal from the operator stationed there, but a short distance beyond the fireman called out that a car was on fire. The engineman thought the information concerned a hot box and did not start to apply the brakes until the train had proceeded another half mile when the fireman repeated the warning and also said that two men were holding to the side of the burning car. The speed was about 40 miles per hour. He made a full service application of the brakes, thinking that a severe run-in of slack would occur from an emergency application, and might cause the men to fall to the ground.

The statement of Fireman Lewis corroborated that of Engineman McLalan.

Neither Conductor Leiberger nor Flagman Atkins was aware of the fire until the train was passing through Broad Ford. By the time they had determined its location the brakes had been applied.

Baggagemaster Berkey worked the sixth and seventh cars; he became aware of fire in the train at Broad Ford but was unable to use the train air signal because there was no cord in the car at the end he was working and the valve itself was inaccessible due to lading. By the time he reached the emergency valve the brakes had already been applied.

Car Foreman Akers, at Connellsville, stated that about 10:30 a.m., December 17, in company with Trainmaster Boyland and Wreckmaster Russell, he tested the signal valve and the emergency valve of P.M. 472. At that time the temperature was above the freezing point. The signal valve operated all right but the emergency valve could not be opened manually. There was rust around the stem outside the body of the valve. The wreckmaster tapped the valve with a hammer a number of times before the valve could be operated, but as soon as the valve parts could be moved the brakes became applied in emergency. The car foreman did not dismantle the valve nor disturb the piping. He also examined the remains of

the lamps and found nothing to indicate that they had exploded. He did not see the remains of any fire extinguishers.

The statement of Wreckmaster Russell agreed with that of Car Foreman Akers.

Trainmaster Boyland stated that he searched the debris for fire extinguishers but was unable to find any. During the tests of the signal valve and the emergency valve he was not inside the car.

Agent Rothlisberger, of the Railway Express Agency, Connellsville, Pa., stated that in cleaning out the rubbish left in P.M. 472 after the fire was extinguished he found the remains of the fire extinguishers.

Machinist Valentine, at Ivy City enginehouse, Washington, D. C., stated that after the accident he was assigned to correct the erratic operation of the train air-signal apparatus on engine 5094. He found the signal line check valve leaking and renewed the check valve. He then tested the apparatus and found it operating properly.

Vice President Bowman, of the Pere Marquette Railway stated that his company has only seven oil-lighted express or baggage cars, including P.M. 472.

Car Inspector Favio, at Fort Street Union Depot, stated that he inspected P.M. 472 upon its arrival on December 15. It was equipped with a signal valve and an emergency valve, and both of these, together with their operating cords, were in good condition. There were also three dry powder fire extinguishers in the car. Air brake inspections and tests on B. & O. passenger train cars at this point meet the requirements of B. & O. air-brake rules which prescribe, among other things, that the emergency valve of each car shall be tested. Prior to the date of this accident the emergency-valve test was made with an uncharged brake pipe and consisted merely in seeing that the valve parts moved; the test made on P.M. 472 on December 15 was made in this manner, but since that time all emergency-valve tests have been made with the brake pipe charged. For some time prior to the accident he had found the oil lamps in P.M. 472 wrapped in burlap upon arrival at Fort Street. On several occasions removal of the burlap disclosed that the oil containers of the lamps were in the position which permits the feed valve to feed oil to the wick, and this fact led him to believe that the burlap was placed around the lamps for the purpose of absorbing the oil which was leaking from the lamps as a result of the improper position of the oil containers. No trouble of this nature is encountered in connection with similar lamps installed on cars running regularly in P.M. trains.

Lampman Krzywicke, at Fort Street Union Depot, corroborated the statement of Car Inspector Favio regarding the condition of the lamps in P.M. 472 when it arrived at Detroit. On the morning of December 15 he found the lamps in P.M. 472 wrapped with burlap which he removed and he then cleaned the lamps and filled them with Mineral Seal Oil.

Coach Yard Foreman Paskey, of the Central Railroad of New Jersey, at Jersey City, N. J., stated that P.M. 472 was last serviced in Jersey City on December 12, 1938, on which date it arrived in B. & O. train 32 and was dispatched in B. & O. train 29. This car was serviced in accordance with B. & O. rules which require that at coach yards a test be made of the signal valve and the emergency valve. The rules of the C.R.R. of N.J. do not require test of these devices but nevertheless it is the practice to make such tests, and to dismantle the car discharge valve and the emergency valve at air-brake cleaning periods. The only oil-lighted cars serviced at Jersey City are those P.M. cars which have been running in non-messenger service between Jersey City and Detroit.

Inspector Witovitz, at the C.R.R. of N.J. coach yard, Jersey City, N. J., stated that he tested the car discharge and emergency valves on P.M. 472 on December 12, 1938. Since there was no entry on his report indicating the existence of any defect on this car he was sure that both valves were operative. The test of the emergency valve was made with the brake pipe charged and consisted of opening the valve enough to permit passage of air at a rate sufficient to be audible. He made no inspection of the lamps.

General Car Foreman Stansbury, of the Central Union Terminal Company, at Cincinnati, Ohio, stated that P.M. 472 arrived in Cincinnati the evening of December 13, and was dispatched from Cincinnati the following evening. It was placed at the loading platform of the express agency where it was inspected and serviced by employees of the C.U.T.Co. None of the inspectors who worked on this car entered any items concerning defects on their inspection reports. This car was serviced as required by the rules of the B. & O. which prescribe tests of both the signal and the emergency valve. These tests were made with fully charged signal line and brake pipe. The signal valve test consists of opening the signal valve by means of the cord and noting that a discharge of air occurs. The test of the emergency valve is nothing more than a visual inspection. Although the rules of the C.U.T. do not require it, a similar inspection of the signal and the emergency valve is made on all cars serviced. Very few oil-lighted cars are serviced by the C.U.T., and since P.M. 472 was a non-messenger car, no attention was given the lamps. The B. & O. does not exercise direct supervision over the servicing of its cars by the C.U.T.

Superintendent Johnson, of the Railway Express Agency, Pittsburgh, Pa., stated that many of the cars used in express service are the property of the various railway companies who are expected properly to maintain the equipment, and to furnish it to the express company in safe and suitable condition for service. The express company does not specify what operating devices shall be installed in these cars, and at the present time it does not prohibit oil-lighted cars from its service. However, the use of oil-lighted cars as messenger cars in main-line service is confined to emergencies such as occurred in the case under investigation wherein the only messenger car in the train was damaged and was set out near Akron, Ohio. The train was without a messenger car from Akron to Pittsburgh where P.M. 472 was manned with a messenger. Before leaving Pittsburgh, Express-Messenger Owens, who had been assigned to P.M. 472, was provided with a hand lantern which was the property of the express company but was filled with oil furnished by the B. & O. After the accident some of this oil was tested by representatives of the Atlantic Refining Company who pronounced it suitable for the service in which it is used. The express company does not instruct its messengers, or other employees who work in cars enroute, with regard to the operation of the train air signal, the conductor's emergency valve or other devices with which the cars are equipped. He considers oil lamps objectionable, both from the standpoint of safety and of damage to lading.

Night Checker Cole, of the Railway Express Agency, Fort Street Union Depot, stated that before sealing the cars he extinguishes any car lamps which may be burning. In extinguishing the oil lamps on P.M. 472 he merely turns the wick downward until the light goes out; he does not move the oil container up. On the night of December 15, he extinguished the lamps in P.M. 472 in the manner described and then sealed the car.

Observations of the Commission's Inspectors

Inspection made by the Commission's inspectors of P.M. 472 disclosed that it was a baggage and express car 65 feet 10½ inches over endsills, with 6-wheel trucks, cast steel body bolsters, and a composite underframe consisting of steel centersills and cross beams. The superstructure is wood with clerestory type roof; the ends are of solid face plate arrangements without diaphragms. On each side two doors slide longitudinally inside of the car and on each end there is a door hinged to open inward. All of the inside lining of this car was badly burned and charred and the roof was burned through in many places.

The air-brake equipment was schedule L3 with one 18-inch brake cylinder; according to the records of the P.M. Ry. this equipment was cleaned March 11, 1938, at Saginaw, Mich. A type B-3-a conductor's emergency valve was fastened 72 inches above

the floor on the inside wall of a locker located in the right corner at the B-end of the car. The piping from the brake pipe to this valve extended upward through the car floor, inside of the locker, to the valve, and the discharge pipe extended downward, inside of the locker, from the valve, through the car floor to the atmosphere. The position of the operating handle of the valve was such that it could not be fouled by the lading of the car.

It was evident that there had been an air-signal discharge valve directly above the door on the inside of the end structure at the B-end; however, this valve and a portion of its connecting pipe had been removed prior to the inspection made by the Commission's inspectors. The piping to the signal discharge valve extended upward from beneath the floor and was fastened to the B-end wall beside the end-door casing.

There were no pull cords attached to either the emergency valve or the signal discharge valve at the time of the inspection but pieces of flexible strand wire were found in the debris remaining in the car.

The conductor's valve was evidently the one which was on the car at the time of the fire as the paint was blistered in places and there was no sign that the pipe connections had been broken or the valve dismantled since the fire. On both the pipes and the valve body there were marks which were evidently the result of blows delivered by some tool. A test of this valve was made with the brake equipment fully charged; since there were no cords in the car the valve handle was opened directly by hand. The valve operated freely and an emergency application of the brakes resulted. After this test the valve was removed and dismantled, and all the piping was examined. A gummy deposit was found at pipe joints and in the ells but not in sufficient quantity to materially obstruct the passage of air. The valve was found to be quite clean but the lower end of the plunger of the rubber-seated valve was covered with a dry, gummy substance which, however, did not offer any great resistance to the movement of the valve. The rubber seat of the valve was intact and permitted but little leakage, indicating that the valve had not been subjected to intense heat.

At the time of the inspection there were no lamps in the car but the lamps with which the car had been equipped were available and were found to have been practically destroyed by fire. They were identified as Adams & Westlake Company Acme Burner Chandeliers, type No. 121. Each chandelier supported two lamps. The car had been equipped with three of these chandeliers attached to the upper deck so that the bottoms of the lamps were 7 feet 1 inch above the car floor. The chandelier assembly included metal ventilators located just above the upper end of each chimney; these ventilators extended through the roof of the car. Separate oil fountains of approximately 1 quart capacity were provided for

each lamp and at the bottom, on the inside, these fountains were equipped with a spring valve having a stem which protrudes a short distance outside the fountain. Assembled in the chandelier the oil fountains telescoped into a receptacle from which a passage extended to the wick tube and to an oil cup below the burner. The wick in the burner absorbed the oil which was delivered from the fountain. When the fountain was allowed to drop to the bottom of its receptacle the feed valve was moved upward by the contact of its stem with the bottom of the receptacle and oil was thus permitted to feed at a predetermined rate to the oil cup below the burner. Raising the fountain upward a proper distance in the receptacle permitted the feed valve in the fountain to close, thus stopping the supply of oil to the wick. The fountain was retained in the upper, or closed, position by lugs, on its side, which rested on the rim of the receptacle, and in order to lower the fountain to proper position for using the lamps it was necessary to rotate the fountain until these lugs dropped into slots cut in the receptacle. Extinguishing a lamp by turning down the wick does not cut off the delivery of oil to the wick and if a fountain were left in the lower position when the lamp was not being used, oil from the fountain continued to flow to the wick. Since no oil was then being consumed, it collected in the wick tube, oil cup, and receptacle, and finally reached the outside of the various parts of the lamp.

Discussion

P.M. 472, an oil-lighted car, was loaded at Detroit on December 15, 1938, and since it was to be a non-messenger, sealed express car, it was loaded in such manner that the end doors were completely blocked by the lading. En route from Deshler, Ohio, to Pittsburgh, Pa., this car was handled in B. & O. train No. 32, and near Akron, Ohio, it became necessary to set out the messenger car in that train because of damage to one of its couplers. No. 32 then was without a messenger car from Akron to Pittsburgh. Between 1:30 and 2 p.m., December 16, the officials of the express agency at Pittsburgh were notified of the absence of a messenger car in No. 32, and without attempting to secure a replacement car they decided to use P.M. 472 as messenger car with the regular messenger in charge. In order to make room for local loading, 8 truckloads of through-rooted express were removed from the car when it arrived at Pittsburgh, but the space thus provided was partially taken up by about 2½ truckloads of local express which were placed in the car. The messenger made no complaint at being assigned to P.M. 472 but did ask for a hand lantern. He was furnished a B. & O. trainman's old lamp which he cleaned and filled with oil furnished by the B. & O. When the car left Pittsburgh both end doors were blocked by express matter. Shortly after leaving West Newton the hand lantern took fire and was thrown from the car. The ceiling lamp in the middle of the car was then lighted but in a very few minutes it burst into flames and was extinguished by turning down the wick. Soon afterwards the ceiling lamp in the

west end of the car was lighted by the messenger but it also burst into flames after a few minutes, and when it was found impossible to control the flames, the occupants of the car attempted to stop the train first by using the train air signal and then the conductor's emergency valve. There was no response to their train air signals, although there was a discharge from the valve; the emergency valve failed to operate.

Most of the cars used by the express agency are furnished by the various railroads upon which they operate. P.M. 472 had been assigned to non-messenger service in trains of the B. & O. between Detroit, Mich., Jersey City, N. J., and Cincinnati, Ohio, since March, 1938. At Detroit, servicing of B. & O. trains is under the supervision of the Pere Marquette, at Jersey City it is under the supervision of the C.R.R. of N.J. and at Cincinnati it is under the supervision of the Central Union Terminal Co. At none of these points does the B.& O. exercise immediate supervision, but the servicing lines adhere to the rules of the B. & O. in servicing its trains. None of the servicing lines require that a test of the emergency valve be made, either at the coach yard or at any other place, but emergency valves on cars composing the trains of the B. & O. are tested in accordance with the previously quoted rule of that company. At Detroit this test was made without air in the brake pipe; at Jersey City it was made with air in the brake pipe but the valve was opened only enough to permit the escape of sufficient air to be audible; at Cincinnati only a visual inspection was given the valve.

The lamps regularly received attention at Detroit, and on the morning of the day on which this car was last loaded at that point they were cleaned and filled with oil of the proper grade. During the loading of the car the lamps were used for a period of about 2 hours without trouble, and before the car was sealed the lamps were extinguished by a car checker who turned down the wicks but did not raise the oil fountains to the position in which the supply of oil to the wick was cut off. This improper operation of the lamps probably resulted in an overflow of the oil contained in the fountain, thus creating a hazardous condition. That the lamps had been operated in this improper manner for some time was apparent from the fact that frequently upon arrival at Detroit, they were found wrapped with burlap which evidently had been placed around them for the purpose of absorbing the overflow oil.

The train air signal failed to accomplish its function properly because of the unreliability of the signal system on No. 32 on the day of the accident. False signals had been received frequently by the engineman during the trip, and the sounding of the cab whistle at unexpected points did not convey any meaning to the occupants of the cab. The cab whistle was actually sounded after the fire broke out but because of the numerous false signals which had already been received, the engineman paid no attention to the

signal beyond looking back for hand signals. There was evidence to the effect that false cab-whistle signals were received on almost every trip, probably due to leakage developing at signal-line hose connections when the train was moving around curves. Upon the arrival of engine 5094 at Washington, D. C., a few hours after the accident, the engineman then in charge reported that the air whistle was blowing at intervals. The mechanic, to whom the work of correcting the defect was assigned, found that the signal-line check valve was leaking and this defect was corrected.

The emergency valve failed to function due to some condition which prevented the various parts of the valve from moving. A test made by the car foreman and the wreckmaster of the B. & O. at Connellsville on the day following the accident developed that the valve could not be operated by moving the handle of the valve manually; however, the employees who made the test loosened the parts by tapping with a hammer so that eventually manual operation of the valve parts was possible. A subsequent inspection of the valve by the Commission's inspectors disclosed that the lower end of the valve plunger was coated with a hard, gummy substance.

The express agency had no rule requiring that a passage to the end doors be maintained in messenger cars, but it had been the general practice to do so. P.M. 472 had not been previously used as a messenger car in the service to which it had been assigned since March, 1938, and in this case its use as such resulted from an emergency. However, since no attempt was made to obtain a replacement car, some effort should have been made to provide a reasonable degree of safety in the emergency car. Without doubt, both occupants of the car could have left in safety had the end doors been accessible.

The express agency does not instruct its messengers or other employees regarding the operation of any of the devices, such as lamps, signal valve or emergency valve, with which express cars are equipped. Instruction is given regarding the use of fire extinguishers. The evidence indicated that the occupants of P.M. 472 were familiar with the operation of the signal and the emergency valve but knew little, if anything, concerning the operation of the lamps. The car was equipped with fire extinguishers but no attempt was made to use them.

The four elements which combined to cause the fire and the resulting fatality were:

Improper use of oil lamps, due to lack of understanding of the proper method of operation.

The failure of the train air signal properly to perform its function.

The inoperative condition of the emergency valve.

The inaccessibility of the end doors.

Oil lamps are obsolete, and are so rarely used in through-line service that many employees are not familiar with the proper method of operating them. Until such time as this type of lamp is entirely eliminated from use in express cars, the express agency should instruct its employees with respect to proper usage.

The evidence indicated that on many trains the operation of the train air signal may be so erratic as to be undependable. If this condition is generally prevalent measures should be taken to substitute a more dependable signal system.

The inoperative condition of the emergency valve no doubt resulted from improper methods of testing and maintenance. The present A.A.R. code of requirements for the maintenance of air brakes does not specifically require the cleaning or testing of this part of the car air-brake equipment, and many of the railroads do not definitely require test at any time. This equipment is provided for use in emergencies only, and it is therefore particularly important that it be properly maintained, and tests to check its condition be made regularly.

Conclusions

The primary cause of the fire in P.M. 472 was improper operation of its oil-lamp equipment, and the cause of the resulting fatality and injury was failure of the train signal system and the emergency valve to function as intended, together with inaccessibility of the end doors of P.M. 472 as a means of egress, due to the position of the lading.

Recommendations

It is recommended:

1. That the use of oil lamps be prohibited in cars in passenger trains in which employees are required to ride or work en route.

2. That steps be taken to incorporate in rules for maintenance of brake and train air-signal equipment a definite requirement regarding cleaning and testing of this equipment.

3. That necessary improvements be made in the train air-signal system to insure that it will properly perform the function for which it is intended.

4. That in cars having end doors, in which employees are required to ride or work en route, the end doors shall be accessible at all times as a means of egress.

5. That employees of the Railway Express Agency employed in train service be properly instructed regarding the use and operation of all train and car devices which may at any time affect their safety.

Respectfully submitted,

W. J. PATTERSON,

Director.