

INTERSTATE COMMERCE COMMISSION

REPORT NO. 3291

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION
REPORTS UNDER THE LOCOMOTIVE INSPECTION ACT
OF FEBRUARY 17, 1911, AS AMENDED

NEW YORK CENTRAL RAILROAD

December 23, 1949

Accident at Mitchell, Ill., on September 19, 1949, caused by
failure of the locomotive reverse gear.

REPORT OF THE COMMISSION¹

PATTERSON, Commissioner:

On September 19, 1949, about 12:20 a.m., at Mitchell, Ill., while New York Central Railroad locomotive 2914, assigned to freight service, was standing in Worchester Yards, the engineer attempted to operate the Precision reverse gear. The handwheel spun rapidly out of control and the handle struck the engineer's hand inflicting serious injuries.

¹Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.

DESCRIPTION OF ACCIDENT

New York Central Railroad locomotive 2914 departed from Mattoon, Ill., September 18, 1949, at about 6:00 p.m., hauling a freight train en route to East St. Louis, Ill., and proceeded without unusual incident to Worchester Yards at Mitchell, Ill., 110 miles from Mattoon. At about 12:20 a.m. on September 19, while the locomotive was engaged in a switching operation and standing at the west end of Worchester Yards, the engineer attempted to operate the reversing gear with result that the handwheel of the Precision power reverse gear suddenly spun out of control. The handle on the handwheel struck his hand and fractured a bone in his arm just above the wrist.

DESCRIPTION OF LOCOMOTIVE

Locomotive 2914, type 4-8-2, carrier's class L2B, was built by the American Locomotive Company in February 1929; steam pressure 225 pounds per square inch; cylinders 27 x 30 inches; driving wheel diameters over full tires 69 inches. It was equipped with Baker valve gear and Franklin Railway Supply Company's Precision power reverse gear, serial number F-1-1-796, in which the handwheel was equipped with a Franklin self-locking clutch.

EXAMINATION OF PARTS INVOLVED

The connection between the right inside valve gear radius bar and the reverse yoke was secured by a bolt, 1 inch in diameter and 6 inches long. The threads had been stripped from the inner end of the bolt, and the cotter pin, nut, and collar were missing. The bolt was partly out of its hole, bent toward the rear, and in a position where its head would rub on the gear connecting rod when the locomotive was in motion. The bolt head was abraded where it had struck the nut on the bolt that held the inside end of the pin connecting the gear connecting rod to the bell crank.

The Precision power reverse gear was equipped with a Franklin self-locking clutch designed to prevent the handwheel from spinning out of control as it did when this accident occurred. This locking action is accomplished by six rollers which move with the indicator screw shaft to which the handwheel is attached and wedge between a locking cam and the inside surface of a stationary steel cup or clutch housing.

This clutch was disassembled and a considerable quantity of oil was found in the clutch housing, on the cam, on the rollers, and on their bearing surfaces on the clutch housing and the locking cam. These bearing surfaces were smoothly finished and were noticeably polished. The surfaces of the locking cam where the rollers rested while the device was not in use were originally ground flat, but because of wear were slightly depressed at the roller contact surface. These depressions tended to prevent the rollers from moving to wedging positions between the locking cam and the clutch housing and thus resist the tendency of the handwheel to spin. The oil in the clutch housing reduced the frictional resistance between the rollers and the cam and clutch housing, and lowered the efficiency of the device.

INSPECTION AND REPAIR REPORTS

Last annual inspection was made December 8, 1948, at Beech Grove, Ind. Last monthly inspection was made August 19, 1949, at Mattoon, Ill.

Daily inspection reports filed at East St. Louis, Ill., covering arrivals of the locomotive from August 9, 1949, to date of the accident were examined. No items were found reported on these reports which had any bearing on the accident.

On September 19, at East St. Louis, Ill., at the end of the trip on which the accident occurred, the engineer reported: "Reverse gear catches and flies backward, examine reverse gear."

SUMMARY OF EVIDENCE

The engineer stated that while the locomotive was standing in Worchester Yards he started to move the power reverse gear from back corner toward forward motion. The reverse gear stuck and he moved it backward and then again tried to move it forward when the handwheel suddenly spun and the handle caught his hand at the base of the thumb, resulting in the fracture of a bone in his forearm just above the wrist.

The fireman stated that when the engineer moved the reverse gear from the back corner the gear stuck. The engineer sent him to the ground to see if a valve gear pin was fouling other parts. He heard the reverse gear spin as he reached the ground and immediately returned to the cab where he found the injured engineer.

The fireman then took over the engineer's duties and handled the locomotive from Worcester Yards to East St. Louis, hauling the caboose only, and arriving at 1:15 a.m. He said that he used the power reverse gear five times and that the first and second times he used it the gear appeared to catch a little but after that it worked all right.

DISCUSSION

The handwheel of the Precision power reverse gear spun out of control after the bolt which secured the right inside radius bar connection to reverse yoke of the Baker valve gear had worked out of position and fouled the nut on the bolt holding the inside end of the pin connecting the gear connecting rod to the bell crank and then partly re-entered its hole suddenly releasing the valve gear. The bolt which secured the radius bar connection to the reverse yoke was found with threads stripped on the inside end and the cotter pin, nut, and collar were missing.

The Franklin self-locking clutch, designed to prevent the handwheel of the Precision reverse gear from spinning out of control, failed to lock because the locking cam was worn and the clutch housing contained a quantity of oil which also reduced the efficiency of the device. The construction did not provide for introduction of oil into the clutch housing, and it is evident that the clutch housing and parts contained therein should not have been oiled except as required when dismantled for overhaul or inspection.

During the past 10 years this Commission has issued a considerable number of reports covering investigation of accidents caused by failure of Precision power reverse gears and spinning handwheels thereof. Such accidents continue to occur. Since July 1, 1949, five such accidents on the New York Central System have been investigated, three of which were caused by handwheels which spun out of control and resulted in broken bones in hands of employees struck by handles on the spinning handwheels. In each of these three instances the reverse gear was equipped with a self-locking clutch designed to prevent a free spinning handwheel.

The initial causes of this undesired spinning are various and well known by mechanical officials of railroads using this type of gear and need not here be discussed in detail other than to say that the spinning action is commonly caused by the displacement or fouling of some part of the gear or reversing mechanism which momentarily retards the intended action. When movement

of the power piston finally occurs it does so with a force that causes violent spinning of the handwheel, the protruding handle of which almost invariably causes injury similar to that which occurred in this instance.

CAUSE OF ACCIDENT

It is found that this accident was caused by the Precision reverse gear handwheel spinning violently out of control as a result of the defective condition of the bolt which secured a radius bar connection to the reverse yoke of valve gear and the defective condition of the self-locking clutch designed to prevent free spinning of the reverse gear handwheel.

Dated at Washington, D. C., this 23rd day
of December, 1949.

By the Commission, Commissioner Patterson.

SEAL

W. P. BARTEL,
Secretary.