INTERSTATE COMMERCE COMMISSION

EIGHTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR
BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

FOR THE FISCAL YEAR
ENDED JUNE 30, 1919

WASHINGTON
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ANNUAL REPORT OF THE CHIEF INSPECTOR OF LOCOMOTIVE BOILERS.

OCTOBER 1, 1919.

To the Interstate Commerce Commission:

In compliance with section 7 of the act of February 17, 1911, as amended March 4, 1915, I have the honor to submit the Eighth Annual Report of the Chief Inspector of Locomotives, covering the work of this bureau, for the fiscal year ended June 30, 1919.

The data contained in this report includes the third full year's work, under the amended act, and covers all defects on all parts and appurtenances of the locomotive and tender, including the boiler, which were found and reported by our inspectors, together with all casualties resulting from the failure of any part or appurtenance of the locomotive and tender, including the boiler.

The succeeding tables and charts have been arranged so as to permit comparison with previous reports, as far as consistent, and show in concrete form the number of locomotives inspected, the number and percentage of those inspected found defective, and the number ordered out of service because of not meeting the requirements of the law, together with the total defects found. They also show the total number of accidents due to failure, from any cause, of the locomotive or tender, including the boiler, and all parts and appurtenances thereof, together with the number of persons killed or injured, caused by such failure.

The amendment to the locomotive boiler inspection law of March 4, 1915, to include the entire locomotive and tender and all appurtenances thereof, did not become effective until September 4, 1915; therefore the record for the fiscal year ended June 30, 1916, includes accidents and casualties investigated under the amended act for only 9 months and 26 days of that year.

Locomotives inspected, number found defective, percentage inspected found defective, number ordered out of service, and total defects found, by comparison.

	1919	1918	1917	1916
Number of locomotives inspected	59,772	41,611	47,542	52,650
Number found defective	34,557	22,196	25,909	24,685
Percentage found defective	58	53	54.5	47
Number ordered out of service	4,433	2,125	3,294	1,943
Total defects found	135,300	78,277	84,883	71,527

Number of accidents, number killed, and number injured, by comparison, covering failures of all parts and appurtenances of the entire locomotive and tender.

	1919	1918	1917	1916
Number of accidents	565	641	616	537
Decrease from previous year.....per cent..	11.8	[1] 4.1	([2]) 62	.....
Number killed	57	46		38
Decrease from previous year.....per cent..	[1] 23.9	25.8	([2]) 721	.....
Number injured	647	756		599
Decrease from previous year.....per cent..	14.4	[1] 4.8	([2])	.....

[1] Increase.
[2] Percentage in decrease not shown for 1917, because of amended act not being in effect the entire year of 1916.

The following table shows the number of accidents, number of persons killed, and number injured, due to the failure of some part or appurtenance of the locomotive boiler only, with their percentage of decrease, by comparison of the fiscal years ended June 30, 1912 and 1913, with the fiscal years ended June 30, 1918, and 1919.

	1919	1918	1913	1912
Number of accidents	341	398	820	856
Decrease 1919 from 1918.....per cent..	14.3	.....	.....	.....
Decrease 1919 from 1912.....do....	60.2	.....	.....	.....
Number killed	45	36	36	91
Increase 1919 over 1918.....per cent..	25	.....	.....	.....
Decrease 1919 from 1912.....do....	50.5	.....	.....	.....
Number injured	413	510	911	1,005
Decrease 1919 from 1918.....per cent..	19	.....	.....	.....
Decrease 1919 from 1912.....do....	58.9	.....	.....	.....

The following table shows the total number of persons killed and injured by failure of locomotives or tenders, or some part or appurtenances thereof, during the four years ended June 30, 1916–1919, classified according to occupations:

	Year ended June 30—							
	1919		1918		1917		1916	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Members of train crews:								
Engineers	14	194	11	245	16	230	11	205
Firemen	22	265	19	306	21	304	12	225
Brakemen	11	82	6	62	13	60	9	74
Conductors	2	16	.....	21	3	14	1	6
Switchmen	1	7	2	8	1	8	.....	6
Roundhouse and shop employees:								
Boilermakers	1	9	.....	11	.....	11	1	11
Machinists	.....	5	.....	11	.....	8	1	11
Foremen	.....	3	1	4	.....	1	1	3
Inspectors	.....	6	4	4	.....	3	.....	3
Watchmen	.....	2	.....	3	.....	5	.....	8
Boilerwashers	.....	7	1	4	.....	7	.....	10
Hostlers	.....	6	.....	8	.....	6	.....	6
Other roundhouse and shop employees	1	11	2	19	2	19	1	21
Other employees	3	23	.....	26	5	22	.....	7
Nonemployees	2	11	.....	24	1	23	1	3
Total	57	647	46	756	62	721	38	599

All accidents which have been reported to this bureau, as required by section 8 of the law, and rules 55 and 162 promulgated thereunder, have been carefully investigated and a report rendered, as required, for the purpose of determining, as far as possible, the exact cause of such accidents, and applying a remedy that will tend to prevent recurrences. Copies of such reports have been furnished to all interested parties, when requested, and to railroad officials, in order to acquaint them with the conditions, as disclosed by our investigations.

The fact that it is known that all accidents will be carefully investigated, and the existing conditions made known by parties whose only interest in such matters is to prevent recurrences, has had a most beneficial effect in reducing the number of casualties to employees and travelers upon railroads, as indicated by a comparison of the reports rendered.

A summary of all accidents and casualties occurring during the fiscal year ended June 30, 1919, covering the entire locomotive and tender and all of their appurtenances, shows a decrease of 11.8 per cent in the number of accidents, an increase of 23.9 per cent in the number killed, with a decrease of 14.4 per cent in the number injured, as compared with the year ended June 30, 1918.

A summary of all accidents and casualties, caused by the failure of the locomotive boiler and its appurtenances only, for the fiscal year ended June 30, 1912, which was the first year of the existence of the law, compared with a summary of all accidents and personal injuries which occurred during the fiscal year ended June 30, 1919, shows the substantial decrease in the number of accidents, due to such failures, of 60.2 per cent; a decrease in the number of persons killed of 50.5 per cent, and decrease in the number injured of 58.9 per cent.

The substantial decrease in the number of accidents and casualties, as shown, has no doubt, been brought about, to a great extent, through the zeal and energy of our inspectors, and their desire to see that the purpose for which the law was enacted was fully carried out, and they are to be commended, when the strenuous conditions with which they have had to contend are remembered. In this we have been generally assisted by a cordial cooperation on the part of the mechanical officials of the carriers, and the United States Railroad Administration, who have accepted the standards established by the Commission as safe and efficient methods.

The increase in the number of persons killed during the last year, over the year previous, is, to a considerable extent, due to some very violent explosions which occurred because of fire box crown sheet failures, which failures serve to illustrate the prime importance of proper fire box construction, inspection and repair, together with

the location, inspection, and maintenance of such appliances as water glasses, gauge cocks, injectors, steam gauges, and safety valves, upon which, to a very great extent, rest the safety of locomotive boiler operation.

While some of these explosions were primarily caused by low water, it is believed that their violence and consequent results, were greatly increased by failure of crown sheet seams which had been welded by the autogenous process. The failure of such seams, which have come into extensive use during the past few years, in most cases evidently caused the initial rupture and, in some cases, occurred with slight overheating.

Investigation of these accidents indicated that the failure of the welds occurred with a higher level of water in the boiler, and consequently a lower temperature in the sheet, than in others where crown sheets failed and did not tear.

It will be recognized that the force of a boiler explosion depends upon the extent and suddenness of the initial rupture, together with the volume and temperature of the water in the boiler at the time of explosion. This feature is illustrated in plates shown, as will be seen by comparison of Plates I to IX and Plates X to XIII.

It is true that not all autogenously welded fire box seams fail at the time of boiler explosion, but inasmuch as our records show that 80 per cent of all such welds involved have failed under such conditions, it is believed that, until some way has been discovered through which the quality and tenacity of a weld so made may be established in advance of its failure, fire box crown sheet seams so constructed should be avoided, where overheating and failure are liable to occur, and that autogenous welding should not be used where the strength of the structure is dependent upon the weld, nor where the strain, to which the structure is subjected, is not carried by other construction; nor in any part of a locomotive boiler wholly in tension while under working conditions.

The reduction in the number of accidents and casualties is gratifying, when it is remembered that the first year's report covered the boiler and its appurtenances only, while this report includes the entire locomotive and tender and all of their appurtenances.

It is believed that the table on page 4, showing the number of accidents, number killed, and number injured, caused by failure of locomotive boilers and their appurtenances only, during the fiscal years ending June 30, 1912 and 1913, as compared with those of 1918 and 1919, will serve to illustrate the effect of the locomotive inspection act and its accomplishments, and will again demonstrate the wisdom and foresight of its advocates and framers. This will be better appreciated when it is considered that in the meantime the scope of the law has been enlarged and the number of locomotives in service, compared with 1912, has increased approximately 10 per cent, together with the difficulty experienced in properly maintaining locomotives, due to the scarcity of labor and materials and the strenuous service in which they were engaged because of conditions brought about by the great World War.

In addition to the work of this bureau, as outlined above, we have furnished to the Assistant Director of Operation, United States Railroad Administration, monthly, a statement showing in detail all defects found on locomotives, operating under the jurisdiction of the Railroad Administration, which constituted violations of the law and rules; and those ordered out of service, as provided for in section 6 of the law.

We have conducted a number of special investigations, at the request of the Railroad Administration, and furnished reports covering conditions found and action taken by our inspectors. In addition, we have reported to the Railroad Administration a number of improper practices and conditions, which did not come within the scope of the law and rules established.

It has been our purpose to cooperate with the United States Railroad Administration and the officials of the various carriers to the fullest extent consistent with our duties and the purpose of the law, and avoid as far as possible being compelled to order locomotives removed from service for unsafe conditions at a time when traffic might be seriously delayed.

We have also furnished transcribed reports, showing defects found on all locomotives ordered out of service, and all defects found approaching violations of the law and rules, to the Federal managers or the chief operating officers of the carriers. This was done for the purpose of keeping them informed of the condition of their locomotives, so that proper repairs might be made to such defects before they became violations, and to prevent, as far as possible, failures which might result in serious accidents to persons and property, and consequently serious delay to traffic, all of which has been of paramount importance, during the strenuous period of the war and the stages of reconstruction through which we have been passing.

Inasmuch as our inspectors are clothed with authority to compel necessary repairs to locomotives, before they are placed in service, so that they may be operated without unnecessary peril to life or limb, and which means, when not so kept, that they are not in a condition to most effectively and efficiently perform the strenuous service required of them, it is believed, by performing their duties in the manner in which they have, the work of inspectors of this bureau has been of great value to the carriers and to the Government. The fact that not a single formal appeal from the decision of any inspector, as provided for in section 6 of the law, has been filed during the fiscal

year clearly demonstrates the wisdom and good judgment that has been exercised by them.

During the year, 198 applications were filed for an extension of time for the removal of flues, as provided for in rule 10. Investigation showed that, in 28 of these cases, the condition of the locomotives was such that no extension could properly be granted. Twenty-two were in such condition that the full extension requested could not be granted, but an extension for a shorter period within the limits of safety was allowed. Eleven extensions were granted after defects disclosed by our investigation had been repaired. Twenty-eight applications were withdrawn for various reasons, and the remaining 109 were granted for the full period requested.

As provided in rule 54, there were filed 3,324 specification cards and 5,949 alteration reports. These were carefully checked in order to determine whether or not the boilers represented were so constructed as to be in safe and proper condition for service, and that the stresses given therein had been correctly calculated.

The provisions of rule 2, by which all boilers are required to have a factor of safety to meet the requirement, has made necessary the strengthening of various parts of numerous boilers.

Substantial progress has been made in equipping locomotives with lights which will meet the requirements of the Commission's orders of December 26, 1916, and December 17, 1917, the effective date of which was fixed as of July 1, 1918.

Notwithstanding the strenuous opposition offered by certain carriers to the promulgation of these requirements, these lights are meeting with the general approval of the employees who are employed where locomotives are so equipped; and the general expression is that "they are a great safety device." A number of the railroad officials, under whose jurisdiction these lights are being operated, have expressed their opinion that "they are economical and add materially to the safety of operation."

Under the order of the Commission of April 7, 1919, certain modifications in the rules, which were granted in their order of September 20, 1917, because of conditions brought on by war, were abrogated, and others substituted. Experience had demonstrated that certain modifications, granted in the Commission's order of September 20, 1917, could be made permanent, without adversely affecting the safety of operation; therefore, such modifications were retained in the rules.

In order that special analysis may be made of accidents resulting from failure of the various parts and appurtenances of locomotives and tenders, attention is invited to the charts on pages 15 to 19 which show in comparative graphic form the accidents resulting from failure of the various parts and appurtenances listed.

In the consideration of these charts, proper recognition should be given to the extraordinary service in which the motive power of the nation was employed during the strenuous period brought about by the World War. The service which was necessary on the part of both equipment and those engaged in its operation and maintenance, as well as the psychological effect of war and the reconstruction period, together with the social unrest that has attended the return from war to peaceful pursuits, has unquestionably had considerable bearing on the number of accidents occurring.

The limited space in this report will not permit of the detailed analysis of each class of failures, as graphically illustrated in the charts. It is interesting, however, to note that during the fiscal year ended June 30, 1912, there were 97 boiler explosions from all causes, resulting in the death of 81 persons and the serious injury of 209 others, while during the last year there were 67 explosions, resulting in the death of 39 persons and the serious injury of 112 others. These reductions amount to 30.9 per cent in the number of explosions, 51.8 per cent in the number killed, and 46.4 per cent in the number injured.

Attention is also directed to the fact that, since the inception of this bureau, 516 boiler explosions have occurred, resulting in the death of 277 persons and the serious injury of 889 others.

Five of these explosions, resulting in the death of 29 persons and serious injury of 50 others, were due to failure of shell sheets, caused by overpressure or defective sheets, which could have been detected and their failure avoided by proper inspection and repairs; 289, causing the death of 156 persons and serious injury of 486 others, were due to failure of crown sheets, caused by low water, and where no contributory defects were found; 195, resulting in the death of 83 persons and the serious injury of 317 others, were due to failure of crown sheets caused by low water and where contributory defects, constituting violation of the law or rules, such as defective water glasses, gauge cocks, injectors, broken stays or crown bolts, etc., were found; 22, causing the death of 4 persons and the serious injury of 31 others, were caused by failure of firebox sheets, due to defective or broken staybolts or crown stays; 5, causing the death of 5 persons and the serious injury of 5 others, were due to foaming of the water in the boiler, allowing the firebox sheets to become overheated.

The above data illustrate the vital importance of proper construction, inspection, and repair of all parts and appurtenances of the boiler, especially the fire box and water indicating and feeding devices. In addition to these, such items as steam gauges, safety valves, fusible plugs, stays, braces, proper feedwater, and boiler washing are among the most important items in the prevention of boiler explosions.

Investigation showed that in 19 of the explosions which occurred during the last year, due to low water, defective water glasses and connections contributed to the cause of such failures, which fact clearly demonstrates again the importance of properly locating and maintaining such parts.

A review of the data shown in these charts will disclose other items which, as indicated by the number of accidents occurring because of failure thereof, are not receiving the attention which they deserve. For example, our records show that during the past eight years, failure of squirt hose and their connections caused 976 accidents, resulting in the death of one person and the serious injury of 984 others; failure of 362 flues caused the death of three persons and the serious injury of 425 others; failure of 511 water glasses or their connections caused the death of one person and the serious injury of 515 others; failure of 148 grate-shaking appliances resulted in the death of one person and the serious injury of 147 others.

A review of the table on page 19 will disclose the source of other accidents, equal in importance to those referred to in the preceding paragraphs.

It should be borne in mind that there are in service approximately 69,000 locomotives, employed on more than 250,000 miles of railroad, which come under the jurisdiction of the law and rules. The law provides for only 50 Federal inspectors, whose duties are to see that the provisions of the law and rules are properly complied with; therefore, it is a physical impossibility for these 50 inspectors to inspect at regular intervals and be familiar with the condition of any large percentage of these locomotives.

The law places the responsibility for the general design, construction, and maintenance of all locomotives and tenders upon the carrier owing or operating them. It appears, however, that many officials and employes of the carriers, who are responsible for the inspection and repair of locomotives, have tried to evade this responsibility, and have, apparently, endeavored to transfer it to the Federal inspectors, by allowing locomotives to remain in service with serious violations of the law and rules known to them, until our inspectors found them and caused the locomotives to be removed from service for needed repairs.

The data shown in this report should impress the necessity of proper performance of duties upon those who are required to inspect and report defects on locomotives, as well as upon those who are responsible for the proper repair of such defects.

If the various parts and appurtenances, which are shown in this report to have caused accidents by their failure, had been inspected and maintained as required by the law and rules, nearly all of such

accidents would have been avoided; and in the above paragraphs it was not thought necessary to comment upon the measures, which, if carried out, would eliminate such failures. In fact, the great majority of accidents which occur could be prevented, by means which are known to every well-qualified mechanical official and employee in charge of such inspections and repairs.

The number of accidents, due to failure of the different parts and appurtenances, have in most cases systematically declined since the first year of the law. In this we feel gratified; and the purpose of the analysis, as given, is to direct the attention of all concerned to the nature of some of the defects which are causing accidents and casualties, and, in so doing, impress upon them the necessity of action to prevent recurrences.

Section 7 of the act of February 17, 1911, amended March 4, 1915, requires, in addition to the annual report of the Chief Inspector to the Interstate Commerce Commission, that he shall make such recommendations for the betterment of the service, as he may desire. In accordance with the above, the following recommendations are most respectfully made, and the reasons therefor given:

First. That the act of February 17, 1911, be amended so as to provide for at least 50 additional inspectors.

The act of February 17, 1911, provided that 50 inspectors should be appointed, whose duties would be to make such personal inspections of locomotive boilers under their care, from time to time, as might be necessary to fully carry out the provisions of the act, their first duty, however, being to see that the carriers make inspections in accordance with the rules and regulations established or approved by the Interstate Commerce Commission, and that carriers repair the defects which such inspections disclosed before the boiler or boilers or appurtenances pertaining thereto are again put in service, so that they might be employed in moving traffic without unnecessary peril to life or limb, at which time there were approximately 63,000 locomotives in service coming under the jurisdiction of the law.

Since this act was established it has been amended, extending the authority of the Chief Inspector and his two assistants, together with all the district inspectors, to cover the entire locomotive and tender and all of their appurtenances, and, since this time, the number of locomotives in service has increased approximately 10 per cent, which has of necessity extended the scope of inspection to such an extent that the 50 inspectors provided are unable to satisfactorily and efficiently perform the duties required of them.

Second. That all locomotives not equipped with mechanical stokers or those using oil for fuel shall have a mechanically operated fire door, so constructed that it may be operated by pressure of the foot

on a pedal, or other suitable device, located on the floor of the cab or tender at a proper distance from the fire door so that it may be conveniently operated by the person firing the locomotive.

This recommendation is based on the results of many investigations of boiler failures of such character as to permit the steam and water contained in the boiler at the time of the accident to be discharged into the fire box, many times directed toward the fire box door.

The old swing type door, which is largely used at present, is almost invariably blown open, in case of such accidents, and permits the discharging steam and boiling water, with the contents of the fire box, to be blown into the cab of the locomotive, seriously and most frequently scalding and burning the persons therein. Such accidents frequently occur while coal is being put into the fire box and with the fire door necessarily open, and, under such circumstances, it is impossible for it to be closed.

The automatic fire door would remain closed, if closed when the failure occurs. If open, it would automatically close, the moment the operator's foot was removed from the operating device, thus preventing the direct discharge of the scalding water and fire into the cab of the locomotive, with such serious results.

The automatic fire door is not a new and untried device, as there are thousands of them in service, and they are required by law in some States. Their use has proven of great value in preventing serious and fatal injuries, where boiler failures of this nature have occurred.

Third. That a power-reversing gear be applied to all locomotives and that air-operated power-reversing gear have a steam connection with the operating valves conveniently located in the cab, so arranged that, in case of air failure, steam may be quickly used to operate the reversing gear.

Our records indicate that, since September 4, 1915, the effective date of the amendment to the act of February 17, 1911, 138 accidents have occurred, due to the failure of some part of the reversing gear, resulting in serious injury to 138 persons. Such accidents can be practically eliminated by the application of power-reversing gear, which will not only add to the safety of operation of a locomotive, but will add greatly to its efficiency.

This device has proven a success and has been applied on a large number of locomotives operated by the various carriers, and on all standard locomotives constructed under the orders of the United States Railroad Administration.

Fourth. That a power grate shaker be applied to all coal-burning locomotives.

This appliance has been in use for a number of years and tried out very thoroughly, and has been adopted as standard on all road locomotives constructed under the orders of the United States Railroad Administration.

Our records indicate that since September 4, 1915, the effective date of the amendment to the act of February 17, 1911, 148 accidents, resulting in the death of one person and the serious injury of 147 others, have occurred, due to the failure of some part of the grate-shaking apparatus. These casualties could have been entirely eliminated, had there been in use a power grate-shaking device such as that referred to above.

This appliance would not only prove of great value in the conservation of life and limb, but would be of great value in the conservation of fuel used on locomotives by enabling the firemen to keep the fire in proper condition at all times.

Fifth. That all locomotives shall be provided with a bell, so arranged and maintained that it may be operated from the engineer's cab by hand and by power.

The reason for this recommendation has been thoroughly discussed on previous occasions, and its necessity seems so apparent that it hardly requires further comment. We believe, however, that this is an appliance which is vital to the safety of the employees and the general public at highways and other public places where the railroads traverse. The operation of modern motive power demands the full attention of the enginemen, and it is frequently the case, while passing over road crossings and through congested territories, that the operators are so occupied with their other important duties that it is impossible for them to ring a bell by hand, in order to give warning of approaching danger.

A great majority of the locomotives now in service have been equipped with this device, although, like many other appliances in use, they are not always maintained in a proper condition for service.

Sixth. That cabs of all locomotives not equipped with front doors or windows of such size as to permit of easy exit shall have a suitable stirrup or other step and a horizontal handhold on each side, approximately the full length of the cab, which will enable the enginemen to go from the cab to the running board in front of it—handholds and steps or stirrups to be securely attached with bolts or rivets; the distance between the step and handhold to be not less than 60 inches nor more than 72 inches.

This recommendation is based on the result of investigation of accidents of a character which make it impossible for enginemen to remain in the cab and which compel them to make exit through the cab window to the ground or running board. While locomotives

are operating at high speeds, to be compelled to jump from the cab window is exceedingly dangerous and almost invariably results in serious if not fatal injury.

The front doors or windows on modern locomotives are so small that they will not permit the enginemen to pass out through them, thus making it necessary to climb over the roof of the cab or out through the side window.

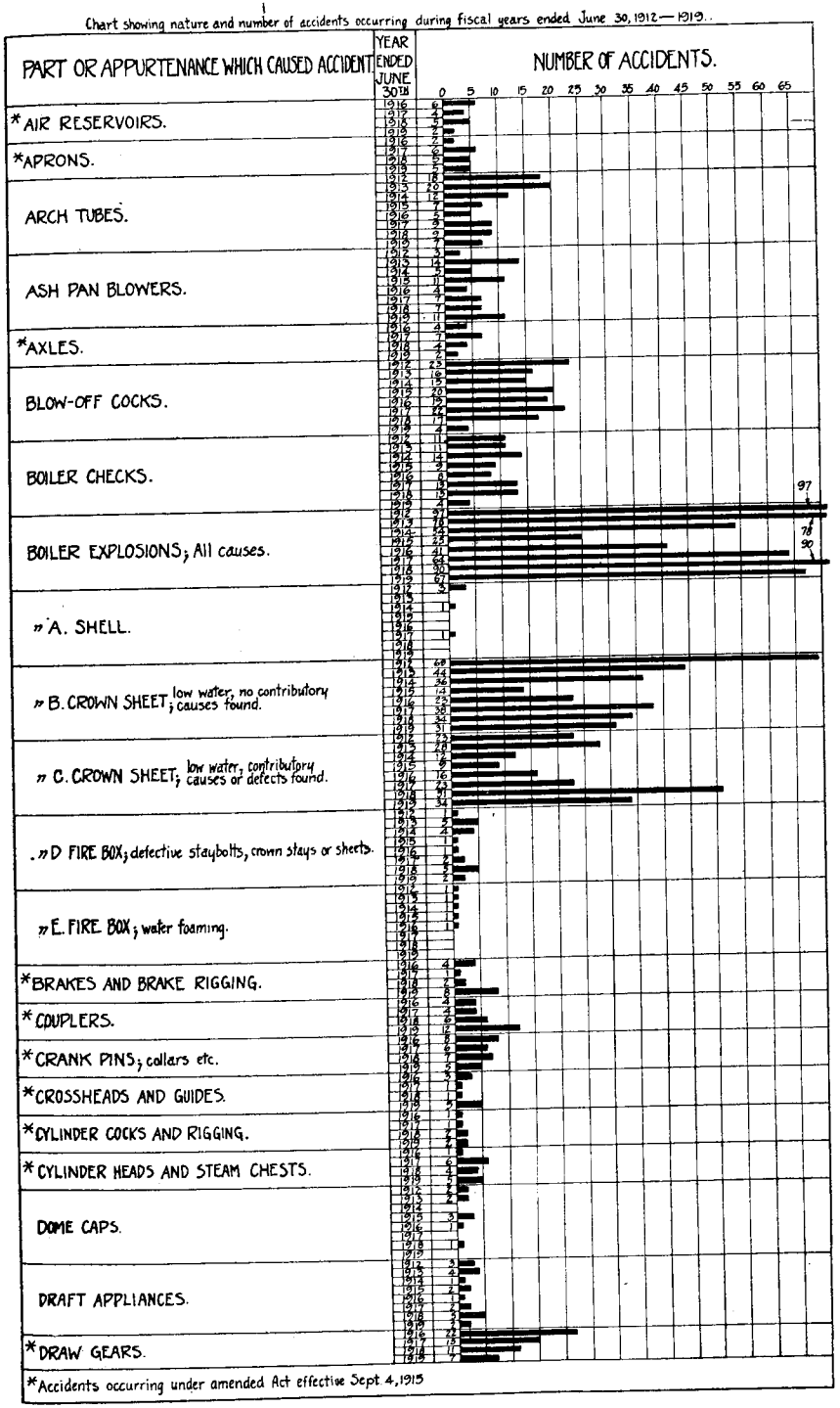
Such arrangements could be applied at a nominal expense and practically without delay to the locomotive, and would add greatly to the safety of the employees.

Accidents resulting in fatal injury, and which were investigated by this bureau, show that injury and death would have been avoided had these appliances been in use.

The appliances included in these recommendations should be applied to all new locomotives before they are placed in service. Locomotives now in service without such appliances should be so equipped the first time they pass through the shop for classified repairs, as specified by the United States Railroad Administration, and all locomotives in service should be so equipped within a reasonable time.

A. G. PACK,
Chief Inspector.

Chart showing nature and number of accidents occurring during fiscal years ended June 30, 1912—1919.



*Accidents occurring under amended Act effective Sept 4, 1915

Chart showing nature and number of accidents occurring during fiscal years ended June 30, 1912—1919.

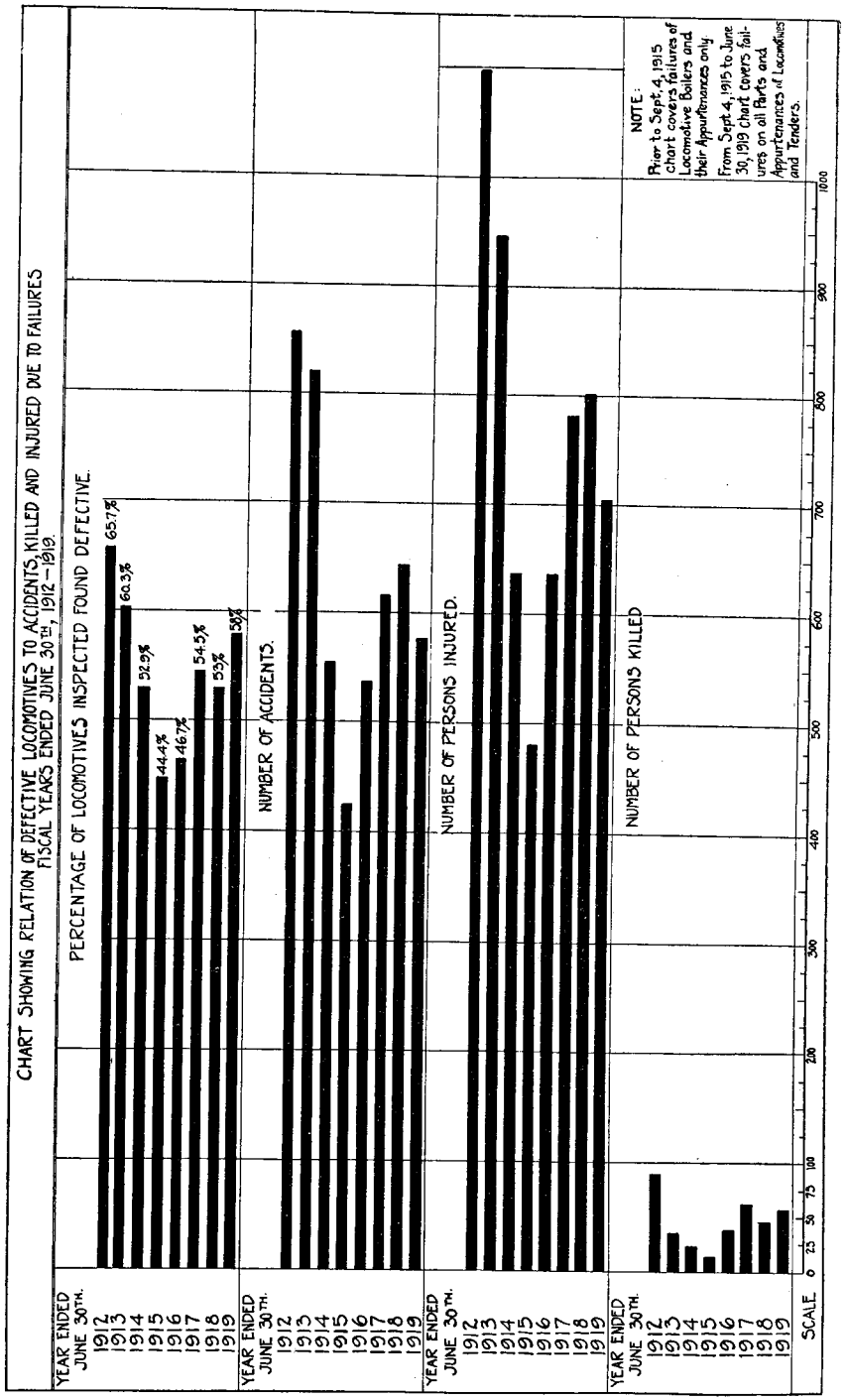
PART OR APPURTENANCE WHICH CAUSED ACCIDENT.	YEAR ENDED JUNE 30TH	NUMBER OF ACCIDENTS.
*FIRE DOORS, levers, etc.	1916	5
	1917	5
	1918	6
	1919	7
FLUES.	1912	56
	1913	54
	1914	51
	1915	41
	1916	37
	1917	50
	1918	40
	1919	33
FLUE POCKETS.	1912	3
	1913	7
	1914	3
	1915	1
	1916	1
	1917	2
	1918	2
	1919	1
*FOOT BOARDS.	1916	2
	1917	6
	1918	7
	1919	7
GAUGE COCKS.	1912	4
	1913	2
	1914	4
	1915	3
	1916	1
	1917	
	1918	1
	1919	
*GREASE CUPS.	1916	3
	1917	3
	1918	1
	1919	2
*GRATE SHAKERS.	1916	23
	1917	31
	1918	29
	1919	27
*HANDHOLDS.	1916	4
	1917	5
	1918	15
	1919	16
*HEADLIGHTS AND BRACKETS.	1916	6
	1917	7
	1918	3
	1919	4
INJECTORS AND CONNECTIONS, not including injector steam pipes.	1912	41
	1913	26
	1914	33
	1915	29
	1916	27
	1917	16
	1918	25
	1919	21
INJECTOR STEAM PIPES.	1912	31
	1913	36
	1914	19
	1915	28
	1916	11
	1917	10
	1918	16
	1919	14
LUBRICATORS AND CONNECTIONS.	1912	11
	1913	15
	1914	22
	1915	10
	1916	15
	1917	11
	1918	17
	1919	9
LUBRICATOR GLASSES.	1912	49
	1913	45
	1914	20
	1915	13
	1916	11
	1917	13
	1918	12
	1919	9
PATCH BOLTS.	1912	
	1913	
	1914	
	1915	
	1916	2
	1917	1
	1918	2
	1919	
*PISTONS AND PISTON RODS	1912	5
	1913	4
	1914	2
	1915	2
PLUGS, arch tube and washout.	1912	15
	1913	20
	1914	20
	1915	16
	1916	17
	1917	8
	1918	12
	1919	30
PLUGS, in fire-box sheets.	1912	1
	1913	5
	1914	6
	1915	1
	1916	3
	1917	1
	1918	3
	1919	2
*REVERSING GEARS.	1916	38
	1917	29
	1918	40
	1919	31
RIVETS.	1912	
	1913	7
	1914	2
	1915	
	1916	4
	1917	4
	1918	2
	1919	2
*RODS, main and side	1916	15
	1917	17
	1918	18
	1919	14
SAFETY VALVES.	1912	
	1913	1
	1914	1
	1915	2
	1916	
	1917	1
	1918	1
	1919	

*Accidents occurring under amended Act effective Sept. 4, 1915.

Chart showing nature and number of accidents occurring during fiscal years ended June 30, 1912—1919.

PART OR APPURTENANCE WHICH CAUSED ACCIDENT.	YEAR ENDED JUNE 30TH	NUMBER OF ACCIDENTS.
*SANDERS.	1916	1
	1917	1
	1918	2
	1919	1
*SIDE BEARINGS.	1916	1
	1917	1
	1918	1
	1919	
*SPRINGS AND SPRING RIGGING.	1916	6
	1917	6
	1918	5
	1919	5
SQUIRT HOSE.	1912	243
	1913	266
	1914	139
	1915	99
	1916	92
	1917	68
	1918	47
	1919	34
STAY BOLTS AND CROWN STAYS	1912	9
	1913	2
	1914	4
	1915	3
	1916	1
	1917	3
	1918	6
	1919	4
STEAM PIPING AND BLOWERS	1912	22
	1913	18
	1914	25
	1915	9
	1916	16
	1917	9
	1918	10
	1919	8
STEAM VALVES	1912	5
	1913	6
	1914	3
	1915	8
	1916	10
	1917	6
	1918	7
	1919	9
STUDS	1912	14
	1913	20
	1914	18
	1915	16
	1916	10
	1917	7
	1918	12
	1919	7
SUPERHEATER TUBES	1912	1
	1913	1
	1914	
	1915	1
	1916	3
	1917	
	1918	3
	1919	1
THROTTLE GLANDS	1912	
	1913	3
	1914	3
	1915	1
	1916	1
	1917	2
	1918	3
	1919	
THROTTLE LEAKING	1912	
	1913	
	1914	1
	1915	1
	1916	1
	1917	1
	1918	2
	1919	1
*THROTTLE RIGGING	1916	5
	1917	5
	1918	5
	1919	4
*TRUCKS; leading, trailing and tender	1916	
	1917	1
	1918	1
	1919	
*VALVE GEAR, eccentrics and rods	1916	7
	1917	10
	1918	12
	1919	5
WATER BARS	1912	3
	1913	3
	1914	2
	1915	1
	1916	1
	1917	
	1918	
	1919	
WATER GLASSES.	1912	165
	1913	128
	1914	60
	1915	48
	1916	28
	1917	39
	1918	20
	1919	17
WATER GLASS FITTINGS	1912	8
	1913	7
	1914	10
	1915	5
	1916	7
	1917	7
	1918	11
	1919	24
*WHEELS	1916	5
	1917	3
	1918	3
	1919	5
MISCELLANEOUS	1912	13
	1913	13
	1914	9
	1915	12
	1916	14
	1917	14
	1918	33
	1919	36

*Accidents occurring under amended Act effective Sept. 4, 1915



Accidents and casualties resulting from failures of locomotives and tenders and their appurtenances.

Part or appurtenance which caused accident.	Year ended June 30 – 1919			1918			1917			1916		
	Accidents.	Killed.	Injured.	Accidents.	Killed.	Injured.	Accidents.	Killed.	Injured.	Accidents.	Killed.	Injured.
Air reservoirs	2	.....	2	5	.....	7	4	1	4	6	.....	9
Aprons	5	.....	5	5	.....	5	6	.....	6	2	.....	2
Arch tubes	7	2	9	9	.....	16	9	.....	15	5	1	7
Ashpan blowers	11	1	10	7	.....	7	7	1	6	4	1	4
Axles	2	.....	2	4	.....	4	7	.....	11	4	.....	4
Blow-off cocks	4	.....	4	17	1	18	22	.....	23	19	.....	20
Boiler checks	4	.....	4	13	.....	14	13	.....	13	8	.....	9
Boiler explosions:												
A. Shell explosions	.....	.....	.....	.....	.....	.....	1	2	8	.....	.....	.....
B. Crown sheet; low water; no contributory causes found	31	26	46	34	15	61	38	30	66	23	7	38
C. Crown sheet; low water; contributory causes or defects found	34	13	63	51	17	82	23	15	32	16	13	21
D. Firebox; defective staybolts, crown stays, or sheets	2	.....	3	5	.....	6	2	.....	2	1	.....	3
E. Fire box; water foaming	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2
Brakes and brake rigging	8	3	10	2	.....	2	1	.....	1	4	1	6
Couplers	12	...	14	6	2	4	4	1	3	4	.....	7
Crank pins, collars, etc	5	.....	6	7	.....	9	6	2	4	8	.....	9
Crossheads and guides	5	.....	5	1	.....	1	1	.....	2	3	.....	4
Cylinder cocks and rigging	2	.....	2	2	.....	2	1	.....	1	1	.....	1
Cylinder heads and steam chests	5	.....	7	4	.....	4	6	2	7	1	.....	1
Dome caps	.....	.....	.....	1	.....	1	.....	.....	.....	1	1	.....
Draft appliances	2	.....	4	5	.....	5	2	.....	3	1	.....	2
Draw gear	7	1	6	11	2	9	15	1	14	22	2	21
Fire doors, levers, etc	7	.....	7	6	.....	6	5	.....	5	2	.....	2
Flues	33	1	39	40	.....	47	50	.....	60	37	.....	46
Flue pockets	2	.....	2	2	.....	2	2	.....	2	1	.....	2
Footboards	7	.....	7	7	.....	7	8	.....	8	2	.....	2
Gauge cocks	.....	.....	.....	1	.....	1	.....	.....	.....	1	.....	1
Grease cups	3	.....	3	1	.....	2	3	.....	3	3	.....	3
Grate shakers	37	1	36	39	.....	39	51	.....	51	23	.....	23
Handholds	16	1	15	15	1	14	15	.....	15	4	1	3
Headlights and brackets	4	.....	5	9	.....	10	8	1	7	6	.....	7
Injectors and connections (not including injector steam pipes)	21	.....	22	23	.....	24	18	.....	19	27	.....	28
Injector steam pipes	14	.....	20	16	.....	18	16	1	18	11	.....	14
Lubricators and connections	11	.....	13	12	.....	12	11	1	12	13	.....	13
Lubricator glasses	9	.....	9	12	.....	12	13	.....	13	11	.....	11
Patch bolts	.....	.....	.....	2	.....	3	1	.....	1	2	.....	3
Pistons and piston rods	2	.....	2	2	.....	2	4	.....	4	5	1	4
Plugs, arch tube and washout	30	1	34	14	2	19	8	.....	12	17	2	22
Plugs in fire box sheets	2	1	1	3	.....	3	1	.....	1	3	.....	3
Reversing gear	31	.....	31	40	.....	40	29	.....	29	38	.....	38
Rivets	2	.....	2	3	.....	3	4	.....	4	4	.....	4
Rods (main and side)	14	.....	15	18	.....	22	17	.....	20	15	1	16
Safety valves	1	.....	1	.....	.....	.....	1	.....	1	1	.....	1
Sanders	.....	.....	.....	2	.....	2	1	.....	1	1	.....	1
Side bearings	1	.....	1	.....	.....	.....	1	.....	1	1	.....	1
Springs and spring rigging	5	2	4	7	.....	7	6	.....	6	8	2	7
Squirt hose	54	.....	54	47	.....	50	69	.....	70	62	1	61
Staybolts	2	.....	2	6	.....	8	3	.....	5	1	.....	1
Steam piping and blowers	8	.....	11	10	.....	11	9	1	13	16	.....	22
Steam valves	9	.....	10	7	.....	17	6	1	5	10	1	13
Studs	7	.....	9	12	.....	13	7	.....	11	10	2	8
Superheater tubes	1	.....	1	3	.....	4	.....	.....	.....	3	.....	4
Throttle glands	.....	.....	.....	3	.....	3	2	.....	2	1	.....	1
Throttle leaking	1	.....	1	2	.....	2	1	.....	1	1	.....	1
Throttle rigging	4	1	7	5	.....	5	7	2	10	5	1	4
Trucks, leading, trailing, or tender	2	1	2	1	.....	1	1	.....	18	.....	.....	.....
Valve gear, eccentrics and rods	9	.....	9	12	.....	12	10	.....	11	7	.....	7
Water bars	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1
Water glasses	26	.....	26	20	.....	20	36	.....	37	29	.....	29
Water glass fittings	4	.....	4	11	1	10	7	.....	7	7	.....	7
Wheels	3	.....	5	7	5	5	3	.....	3	.....	.....	.....
Miscellaneous	35	2	35	32	.....	43	14	.....	14	14	.....	15
Total	565	57	647	641	46	756	616	62	721	537	38	599

NOTE.—Record for 1916 includes accidents due to failure of locomotive boilers and their appurtenances for the entire year and accidents due to failure of parts of locomotives and tenders covered by the amendment to the law for 9 months and 26 days only.

ACCIDENTS RESULTING FROM THE FAILURE OF LOCOMOTIVES AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1919.

[A star (*) indicates accidents taken from records of the Bureau of Statistics of the Interstate Commerce Commission. A double star (**) indicates accidents not properly reported, as required by rules 55 and 162. A complete investigation, therefore, could not be made, inasmuch as this bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.]

ALGER-SULLIVAN LUMBER CO.:

November 4, 1918, locomotive 99, Fowler, Ala. Crown sheet failure; low water; top and bottom water glass cocks closed, and bottom water glass cock handle missing; left injector inoperative, due to plug valve in feed pipe being closed; 1 killed, 1 injured.

One accident; 1 killed, 1 injured.

ARIZONA EASTERN RAILROAD:

May 1, 1919, locomotive 567, Hansen Junction, Ariz. Crown sheet failure; low water; no contributory causes found; 2 injured.

One accident; 2 injured.

ARKANSAS & LOUISIANA MIDLAND RAILWAY:

January 16, 1919, locomotive 76, Crossett, Ark. Crown sheet failure; low water; lowest reading of water glass 2¼ inches above highest point of crown sheet; 1 injured.

One accident; 1 injured.

ATCHISON, TOPEKA & SANTA FE RAILROAD:

August 13, 1918, locomotive 103, (R. M. & S. F.), Hebron, N. Mex. Water glass burst; cut by flying glass; shield removed at time of accident; 1 injured.

November 3, 1918, locomotive 1486, Argentine, Kans. Washout plug blew out; attempted to tighten under pressure; 1 injured.

*December 6, 1918, locomotive 612, Grenola, Kans. Side rod broke at defective weld; 1 injured.

*January 7, 1919, locomotive 538, Milan, Kans. Eccentric strap broke, due to old fracture in strap bolts, causing reverse lever to strike engineer; 1 injured.

February 13, 1919, locomotive 1828, Chillicothe, Ill. Bullseye lubricator glass and packing nut blew out, due to worn threads and loose-fitting nut; 1 injured.

February 20, 1919, locomotive 567, Emporia, Kans. Water glass burst; cut by flying glass; inefficient shield; 1 injured.

**February 26, 1919, locomotive 1222, Calwa, Calif. Washout plug blew out; attempted to tighten under pressure; 1 injured.

March 4, 1919, locomotive 1407, Newton, Kans. Bonnet and stem of water glass cock screwed out; 1 injured.

April 22, 1919, locomotive 550, Fort Madison, Iowa. Crack in lubricator where packing nut was screwed in, allowing nut and glass to blow out; 1 injured.

**May 20, 1919, locomotive 1079, Independence, Kans. Water glass burst; cut by flying glass; 1 injured.

June 19, 1919, locomotive 3107, Chanute, Kans. Squirt hose parted at splice; hose not clamped; 1 injured.

*June 21, 1919, locomotive 1357, Rocky Ford, Colo. Water glass burst; cut by flying glass; 1 injured.

Twelve accidents; 12 injured.

ATLANTIC COAST LINE RAILROAD:

September 15, 1918, locomotive 701, Jacksonville, Fla. Squirt hose burst; hose worn and defective; 1 injured.

October 4, 1918, locomotive 1584 (Southern), Brunswick, Ga. Right front driving spring hanger broke; old flaw in hanger; 1 killed.

November 1, 1918, locomotive 347, Darlington, S. C. Injector steam pipe collar pulled off, due to defective brazing; 1 injured.

November 2, 1918, locomotive 270, near Dinsmore, Fla. Crown sheet failure; low water; tank hose strainers missing; seven crown bolts broken—old breaks; 2 injured.

November 19, 1918, locomotive 388, Fort Mudge, Ga. Crown sheet failure; low water; bottom water glass cock partially closed by rubber packing and scale; strainers missing from tank and tank hose; 2 injured.

January 3, 1919, locomotive 209, near Quitman, Ga. Arch tube burst, due to overheating; 1 injured.

February 23, 1919, locomotive 1045, (U. S. A.), near McPherson, Fla. Squirt hose blew off; hose insecurely clamped; 1 injured.

*March 20, 1919, locomotive 1104, Collier, Va. Piston head blew out of cylinder; 1 injured.

April 5, 1919, locomotive 243, near Bonnyman, Ga. Right main driving wheel tire broke; 2 injured.

April 15, 1919, locomotive 906, near Steckert, Fla. Arch tube pulled out of flue sheet, due to improper application; 1 injured.

*June 27, 1919, locomotive 1109, Bennett Yard, S. C. Squirt hose burst; 1 injured.

Eleven accidents; 1 killed, 13 injured.

BALTIMORE & OHIO RAILROAD:

July 9, 1918, locomotive 7124, near Rodemer, W. Va. Crown sheet failure; low water; no contributory causes found; 3 killed.

July 15, 1918, locomotive 5045, (Southern), Kirkwood, Ohio. Ashpan blower pipe parted at union, due to improper fit; defective threads on union; 1 injured.

July 20, 1918, locomotive 1358, Brownsville, W. Va. Derailment, due to poor alignment of track on sharp curve; and 1 inch lateral motion in engine-truck center casting; 1½ inches 2¼ inches lateral motion between hubs of back engine-truck wheel and box; lateral motion between hubs of front driving wheels and boxes; front engine truck wheels, measured back to back, vary five-eighths inch; back engine-truck wheels on same axle, measured back to back, vary 1 1/16 inches, with uneven flange wear; flange cutting two-thirds of the circumference; main frame showed wear from truck-wheel flanges where they had been fouling or cutting on both sides, due to excessive lateral motion; 1 killed, 1 injured.

July 31,1918, locomotive 1328, Parkersburg, W. Va. Arch-tube washout plug blew out; plug insecurely applied; 1 injured.

August 5, 1918, locomotive 4172, Willard, Ohio. Injured while operating reverse lever; valve bull ring and packing rings broke and parts entered port of valve; valve not properly lubricated, due to oil pipe choke being peened over; 1 injured.

September 24, 1918, locomotive 7136, Bond, Md. Derailment, due to radius-bar pin missing; radius-bar U brace loose at both ends and bolts missing, and radius bar fouling cylinder frame and bolts; 1 killed.

October 5, 1918, locomotive 2578, Braddock, Pa. Locomotive parted from train, due to low coupling on tender; 1 injured.

October 6, 1918, locomotive 5105, Knoxville, Md. Cab apron bolt missing, permitting apron to slip out of place; 1 injured.

October 20, 1918, locomotive 2840, Columbus, Ohio. Crown sheet failure; low water; operating without water glass; water-glass blow-off cock handle missing; 2 killed.

October 26, 1918, locomotive 4004, Kibler, Ohio. Step on front end of locomotive gave away, due to nuts missing; 1 injured.

November 27, 1918, locomotive 1829, Fairmont, W. Va. Washout plug blew out; attempted to tighen under pressure; plug cross-threaded; 1 injured.

December 23,1918, locomotive 2002, Reduction, Pa. Derailment, due to front driving brake beam falling on track; excessive lateral play in front driving wheels; cotter pin missing from right No. 1 brake hanger pin; 3 killed, 1 injured.

December 29, 1918, locomotive 2282, (U. P.), near Holgate, Ohio. Knuckle pin worked out, permitting back section of side rod to become disconnected; 1 injured.

January 2, 1919, locomotive 5120, Philadelphia, Pa. Water-glass steam pipe parted at spanner nut connection, due to improper fit of union nut, and binding against steam-heat extension handle; 1 injured.

January 9, 1919, locomotive 5081, Cumberland, Md. Lubricator drain cock broke off, while attempting to tighten under pressure; 2 injured.

February 7, 1919, locomotive 5121, Baltimore, Md. Handhold pulled off at column bracket, permitting fireman to fall to ground while locomotive was running at a speed of 35 miles per hour; 1 injured.

*February 12.1919, locomotive 1622, Grafton, W. Va. Spring hanger broke; 1 injured.

**February 18,1919, locomotive 1908, near Salesville, Ohio. Injured while shaking grates, due to bolt losing out of shaker lever; 1 injured.

February 22,1919, locomotive 6011, Foleys, Pa. Crown sheet failure; low water; gauge cock drip stopped up; tank hose strainers missing; 4 injured.

**March 24, 1919, locomotive 2773, Coal Junction, Pa. Tender derailed, due to lack of side-bearing clearance; center plate worn, causing tank to ride rigid; 1 injured.

April 1, 1919, locomotive 1770, Riverside, Md. Defective stop for reverse lever and insufficient clearance between reverse lever and bottom gauge cock, injuring engineer's hand; 1 injured.

**April 3, 1919, locomotive 1586, Cone Yard, Ill. Pilot beam became loose, due to broken bolts; 1 injured.

*June 1, 1919, locomotive 362, Camden Station, Md. Shaker bar broke; 1 injured.

June 8, 1919, locomotive 1902, Newark Ohio. Left corner of cab apron bent upward and hole worn in end sill of tender frame, allowing fireman's foot to be caught; 1 injured.

June 13, 1919, locomotive 4218, Roberts, Pa. Gasket blew out of injector steam-pipe connection at injector; 1 injured.

June 20, 1919, locomotive 5087, near Pattersons Creek, Md. Blower pipe broke off at smoke-box fitting, causing back draft, due to being screwed into fitting only two threads, and pipe not clamped in front end; 2 injured.

Twenty-six accidents; 10 killed, 28 injured.

BANGOR & AROOSTOOK RAILROAD:

January 19,1919, locomotive 74, Van Buren, Me. Crown sheet failure; low water; top water-glass cock found closed at time of investigation; 1 killed, 1 injured.

One accident; 1 killed, 1 injured.

BINGHAM & GARFIELD RAILWAY:

July 29, 1918, locomotive 401, Arthur, Utah. Failure of left No. 1 driver-brake beam hanger pin, allowing brake beam, head, and shoe to fall, derailing locomotive; 2 injured.

One accident; 2 injured.

BIRMINGHAM BELT RAILROAD:

April 5, 1919, locomotive 3702, (St. L. S. F.), Birmingham, Ala. Crown sheet failure; low water; no contributory causes found; 1 injured.

One accident; 1 injured.

BOSTON & ALBANY RAILROAD:

August 19, 1918, locomotive 126, Alliston, Mass. Squirt hose blew off; hose defective, and not clamped; 1 injured.

October 15, 1918, locomotive 1014, White Mills, N. Y. Injector feed pipe spanner nut worked off while injector was in operation; pipe not clamped; 1 injured.

February 22, 1919, locomotive 315, near Newton, Mass. Blower valve bonnet screwed out while attempting to open valve, due to loose-fitting bonnet; 1 injured.

Three accidents; 3 injured.

BOSTON & MAINE RAILROAD:

December 26, 1918, locomotive 2319, East Kingston, N. H. Crown sheet failure; low water; no contributory causes found; 3 injured.

January 15, 1919, locomotive 2331, Salem, Mass. Shaker bar slipped off lever; 1 injured.

January 24, 1919, locomotive 2619, Littleton, Mass. Shaker bar slipped off lever; 1 injured.

February 3, 1919, locomotive 3639, Nashua, N. H. Shaker bar slipped off lever; 1 injured.

February 14, 1919, locomotive 2321, Plymouth, N. H. Shaker bar slipped off lever; 1 injured.

March 5, 1919, locomotive 1150, North Lexington, Mass. Piece 4¼ inches long by 1¼ inches wide broke out of flange of right cylinder saddle at steam-pipe connection, causing back draft; 1 injured.

Six accidents; 8 injured.

CENTRAL OF GEORGIA RAILROAD:

*March 20, 1919, locomotive 1826, Echeconnee, Ga. Main pin on locomotive broke, breaking main rod; old flaw in pin; 1 injured.

One accident; 1 injured.

CENTRAL RAILROAD OF NEW JERSEY:

*September 21, 1918, locomotive 683, Catasauqua, Pa. Handhold on locomotive broke; 1 injured.

November 10, 1918, locomotive 162, Coalport, Pa. Drawbar and safety chains broke; old fracture extending entirely through pinhole of drawbar, and safety chains with defective welds; 1 injured.

December 23, 1918, locomotive 434, Odenwald, Pa. Dry pipe leaking bad, and cylinder cocks on left side would not open from cab; engineer was on the ground attempting to repair cylinder cock, when it opened, and was scalded by accumulated steam and hot water; dry pipe had been reported leaking eight times previous to accident, and cylinder cocks were reported inoperative once; 1 injured.

June 19, 1919, locomotive 440, Phillipsburg, N. J. Drifting valve bonnet failed at flange, allowing bonnet to blow off; 1 injured.

Four accidents; 4 injured.

CHESAPEAKE & OHIO RAILROAD:

September 1, 1918, locomotive 662, near Scott, W. Va. Crown sheet failure; low water; right tank valve disconnected and missing, and left one off seat ; steam gauge 15 pounds heavy; 2 injured.

September 6, 1918, locomotive 18, (A. C. & I.), Ashland, Ky. Water glass burst; inefficient shield; cut by flying glass; 1 injured.

September 9, 1918, locomotive 776, Steele, Va. Flue broke at weld; overheated in welding; 1 injured.

October 12, 1918, locomotive 4515, (U. S.), War Minister, Va. Crown sheet failure; low water; water glass on right side broken, and water-glass cocks closed; water in left water glass could not be seen by engineer from his position in cab; Sargent safety water-glass shield covered with coal dust, and smoked on inside, and tubular water glass muddy on inside; gauge cock drip stopped up with waste; 46 button-head radials calked and leaking; 2 injured.

*November 5, 1918, locomotive 356, Logan, W. Va. Handhold on locomotive broke off, permitting brakeman to fall; 1 killed.

November 9, 1918, locomotive 927, Carntown, Ky. Crown sheet failure; low water; no contributory causes found; 3 injured.

January 2, 1919, locomotive 736, Quinnemount, W. Va. Injector steam-pipe collar failed at connection to injector; uneven strain on collar, due to improper alignment with injector; 3 injured.

**February 3, 1919, locomotive 676, Clifton Forge, Va. Washout plug blew out; attempted to tighten under pressure; 1 injured.

March 23, 1919, locomotive 925, Frost, Ky. Crown sheet failure; low water; eight Tate flexible bolts were found broken in combustion chamber, five of which were adjacent; 2 injured.

April 27, 1919, locomotive 412, Earling, W. Va. Front buffer beam broke, due to old defect; 1 injured.

**June 4, 1919, locomotive 346, Richmond, Ind. Broken bolts in coupler on front end of locomotive, causing locomotives, which were double-heading, to separate; 1 injured.

Eleven accidents; 1 killed, 17 injured.

CHICAGO & ALTON RAILROAD:

August 22, 1918, locomotive 858, Shackleford, Mo. Engineer injured while attempting to cool hot journal; 1 injured.

**May 7, 1919, locomotive 826, Odessa, Mo. Injured while operating reverse lever; insufficient clearance between lever and independent driver brake valve; 1 injured.

June 17, 1919, locomotive 72, Kansas City, Mo. Spring hanger broke, permitting engine to drop down in front, allowing footboard to catch on guardrail; footboard was lower than allowed by rules; 2 injured.

Three accidents; 4 injured.

CHICAGO & EASTERN ILLINOIS RAILROAD:

September 10, 1918, locomotive 3632, Yard Center, Ill. Top head of main air reservoir blew out, due to failure of duplex air compressor governor to control air pressure; top head of reservoir badly pitted and corroded; original thickness one-fourth inch; thickness at time of accident one-sixteenth inch; 1 injured.

October 10, 1918, locomotive 3666, Villa Grove, Ill. Locomotive ran away and collided with express train; throttle rigging defective; would not latch in closed position when closed in the usual manner, allowing sufficient leakage through throttle to move locomotive and several cars; main throttle was reported "leaking" October 8 and 9, and no explanation made on work report as to why repairs were not made; 1 killed, 4 injured.

*November 28, 1918, locomotive 925, Caynga, Ind. Engines parted, due to low drawbar; 1 injured.

Three accidents; 1 killed, 6 injured.

CHICAGO & NORTHWESTERN RAILROAD:

July 30, 1918, locomotive 1901, New Butler, Wis. Reverse lever slipped out of quadrant; 1 injured.

July 30, 1918, locomotive 1126, Belle Plaine, Iowa. Bonnet of squirt-hose valve blew off; defective threads; 1 injured.

August 2, 1918, locomotive 1301, Laurens, Iowa. Washout plug blew out of front flue sheet; threads on plug and in sheet badly worn; 1 injured.

August 12, 1918, locomotive 1340, Niobrara, Nebr. Squirt hose blew off; hose insecurely applied; 1 injured.

October 3, 1918, locomotive 1730, New Butler, Wis. Washout plug blew out of front flue sheet; defective threads on plug and in sheet; 1 injured.

October 3, 1918, locomotive 1838, Milwaukee, Wis. Reverse lever slipped out of quadrant; counterbalance spring improperly adjusted; 1 injured.

*December 4, 1918, locomotive 162, New Butler, Wis. Arch tube burst; 1 injured.

December 7, 1918, locomotive 190, Guckeen, Minn. Washout plug blew out of front flue sheet, due to defective threads; 1 injured.

*December 27, 1918, locomotive 1571, Woodstock, Ill. Lubricator steam pipe pulled off collar at connection to lubricator; 1 injured.

*January 4, 1919, locomotive 830, Lake Benton, Minn. Driving journal broke, due to old flaw; 1 injured.

*January 7, 1919, locomotive 586, Blodgett, Ill. Driving-wheel brake defective, causing loss of control of locomotive; 1 injured.

*January 19, 1919, locomotive 2318, Chicago, Ill. Back cylinder head cracked, due to cylinder cocks being inoperative from cab; 1 injured.

January 22, 1919, locomotive 461, Chicago, Ill. Washout plug blew out; plug too small, and improperly applied; 2 injured.

February 11, 1919, locomotive 1426, Clinton Junction, Wis. Injured while operatiug reverse lever; stop pin missing from front end of quadrant, permitting engineer's hand to be caught between lever and boiler head; 1 injured.

February 13, 1919, locomotive 1591, London, Iowa. Grease cup plug came out of wrist pin, while train was in motion; threads on plug stripped; 1 injured.

*March 13, 1919, locomotive 355, Kenosha, Wis. Water glass burst; cut by flying glass; 1 injured.

May 10, 1919, locomotive 433, Council Bluffs, Iowa, Reverse lever became unlatched and went into forward motion, due to pin in front end of right valve rod connection working out; 1 injured.

Seventeen accidents; 18 injured.

CHICAGO, BURLINGTON & QUINCY RAILROAD:

July 4, 1918, locomotive 2116, Viele, Iowa. Flue broke at weld; overheated in welding; 1 injured.

July 5,1918, locomotive 5314, Vermont, Ill. Nipple blew out of blow-off cock, due to being insecurely applied; 1 injured.

July 25, 1918, locomotive 2170, near Alexander, Mo. Squirt hose blew off; insecurely clamped; 1 injured.

July 27, 1918, locomotive 1841, Hawthorne, Ill. Squirt hose parted at splice; hose not clamped; 1 injured.

August 7, 1918, locomotive 1974, Galesburg, Ill. Scalded by steam from steam-heat pipe, due to leakly regulating valve; 1 injured.

August 15, 1918, locomotive 1973, Davenport, Iowa. Squirt hose brust; defective hose; 1 injured.

**September 28, 1918, locomotive 2026, near Bucknum, Wyo. Lubricator glass broke; cut by flying glass; 1 injured.

**October 8, 1918, locomotive 1329, Kewanee, Ill. Injured while operating ash-pan damper, due to damper coming in contact with blow-off cock handle, opening blow-off cock; 1 injured.

December 5, 1918, locomotive 1661, Omaha, Nebr. Water glass burst; cut by flying glass; shield removed at time of accident; 1 injured.

December 23, 1918, locomotive 2968, near Girard, Nebr. Bonnet blew out of operating valve to coal passer; 1 injured.

January 7, 1919, locomotive 1233, near Homer, Nebr. Crown sheet failure; low water; no contributory causes found; 1 injured.

January 19, 1919, locomotive 2186, Shelbina, Mo. Lubricator feed glass and shield burst; 1 injured.

January 23, 1919, locomotive 5336, Camp Point, Ill. Crown sheet failure; low water; no contributory causes found; 2 injured.

February 5, 1919, locomotive 1179, Council Bluffs, Iowa. Water glass burst; water glass cock difficult to close, due to being stuck; 1 injured.

April 3, 1919, locomotive 5015, Hannibal, Mo. Squirt pipe disconnected from delivery pipe, and hole closed by driving wooden plug into opening; engineer scalded while removing plug, due to accumulation of hot water in delivery pipe; 1 injured.

Fifteen accidents; 16 injured.

CHICAGO GREAT WESTERN RAILROAD:

*May 12, 1919, locomotive 329, Nerstrand, Minn. Drawbar pulled out of engine, due to broken bolts; 1 injured.

One accident; 1 injured.

CHICAGO, MILWAUKEE & ST. PAUL RAILROAD:

*July 22, 1918, locomotive 8019, Cologne, Minn. Knuckle pin on locomotive broke; defective knuckle pin; 2 injured.

August 23,1918, locomotive 2221, Mitchell, S. Dak. Washout plug blew out of front flue sheet; plug of improper size, and hole located where it was almost impossible to inspect threads; 1 injured.

September 12, 1918, locomotive 2054, Madison, Wis. Lubricator valve spindle blew out; 1 injured.

September 12, 1918, locomotive 1143, Mitchell, S. Dak. Injector steam ram packing nut blew off; nut too large; 1 injured.

November 18, 1918, locomotive 2440, Milwaukee, Wis. Main air reservoir drain cock nipple blew out; nipple loose, and drain cock stopped up with rust and sediment; 1 injured.

November 24, 1918, locomotive 6609, Melstone, Mont. Water glass burst; cut by flying glass; inefficient shield; 1 injured.

November 29, 1918, locomotive 2145, Presho, S. Dak. Ashpan lever slipped off shaft, due to cotter key missing; 1 injured.

December 3, 1918, locomotive 1275, Chicago, Ill. Water glass burst; shield disconnected at bottom; scalded by escaping steam and water; 1 injured.

December 11, 1918, locomotive 1163, Harlowtown, Mont. Handrail became disconnected and broke; pins at back end of rail missing, and handrail weakened, due to being partially cut away; 1 injured.

**December 26, 1918, locomotive 1273, Galewood, Ill. Scalded while attempting to operate injector, due to overflow pipe not in proper position; 1 injured

January 2, 1919, locomotive 4126, Madison, Wis. Plug blew out of mud ring, while attempting to calk under pressure; threads on plug and in sheet corroded away; 1 injured.

February 23, 1919, locomotive 8628, (U. S.), near Harper, Ill. Crown sheet failure; low water; no contributory causes found; 3 injured.

*March 14, 1919, locomotive 5578, Vananda, Mont. Handrail on front of engine pulled out; 1 injured.

March 25, 1919, locomotive 11, (T. E.), Morton, Wash. Crown sheet failure; low water; no contributory causes found; 1 injured.

April 4, 1919, locomotive 6530, near Rutledge, Iowa. Washout plug blew out of front flue sheet; threads in sheet practically worn away; 2 injured.

**May 27, 1919, locomotive 9508, Seattle, Wash. Bolt came out of hinge of cab apron, causing fireman to fall; 1 injured.

Sixteen acidents; 20 injured.

CHICAGO, ROCK ISLAND & PACIFIC RAILWAY:

July 17, 1918, locomotive 2132, Alderson, Okla. Shaker bar slipped off lever, due to loose fit; 1 injured.

July 19, 1918, locomotive 1843, Haileyville, Okla. Squirt hose blew off; defective hose, and insecurely clamped; 1 injured.

August 18, 1918, locomotive 2532, De Pue, Ill. Shaker bar broke at weld; defective weld; 1 injured.

August 21, 1918, locomotive 824, near Watkins, Colo. Right top crosshead gib broke and flew from crosshead, a fragment striking engineer; the following was reported previous to the accident: "Lateral babbitt gone out of right top gib. Nuts loose right top gib bolt"; 1 injured.

September 1, 1918, locomotive 1651, Silvis, Ill. Injured while operating reverse lever; water foaming and valves dry; 1 injured.

September 4,1918, locomotive 1768, Kerfoot, Okla. Flue pocket blew out of front flue sheet, due to improper application; 1 injured.

September 12, 1918, locomotive 2042, Blue Island, Ill. Defective handrail on locomotive causing fireman to fall; 1 injured.

September 18, 1918, locomotive 927, Green River, Ill. Knuckle pin on right side rod worked out while locomotive was running at a speed of 60 miles per hour, causing

front end of back section of side rod to come loose, and also breaking back section of left side rod; right main driving box crown brass broken; right main side rod bushing worn five thirty-seconds inch larger than pin diameter; left main driving box crown brass worn one-sixteenth inch larger than journal; right knuckle pin nut was reported to be renewed two days previous to accident, and the following was reported the next day: "One right knuckle pin nut broke; engine pounds very bad." This work reported, was marked as repaired. The right knuckle pin was reported very loose on September 8; 1 injured.

September 19, 1918, locomotive 1619, Mokena, Ill. Squirt hose burst; defective hose; 1 injured.

**September 25, 1918, locomotive 1622, Trenton, Mo. Washout plug blew out; attempted to tighten under pressure; plug cross-threaded; 1 injured.

September 25, 1918, locomotive 2139, Yukon, Okla. Arch tube pulled out of flue sheet, due to not being belled or beaded; examination disclosed that tube lacked three-eighths inch of extending through sheet at top edge, and one-eighth inch at bottom, and that left middle arch tube only extended flush with sheet, and had not been belled or beaded, while the other two tubes extended through the sheet, but had not been belled or beaded to hold them in place; 1 injured.

October 3, 1918, locomotive 74, Rock Island, Ill. Squirt hose burst; defective hose; 1 injured.

November 25, 1918, locomotive 1309, Oklahoma City, Okla. Flue broke at weld; overheated in welding; 1 injured.

*December 23, 1918, locomotive 126, Rockdale, Ill. Left No. 1 spring on engine broke; 1 injured.

January 23, 1919, locomotive 1624, Seneca, Ill. Shaker bar broke; old flaw in bar; 1 injured.

February 25, 1919, locomotive 839, near Palestine, Ark. Right main rod broke, stripping locomotive, and knocking out front cylinder head; old flaw in rod; 2 injured.

March 24, 1919, locomotive 487, Evans, Iowa. Top rail on side of tender, for purpose of keeping coal from falling off, gave away; rivets at both ends of rail entirely rusted away, and rivet missing from center hole; 1 injured.

April 9, 1919, locomotive 3010, Kearney, Mo. Squirt hose blew off; hose insecurely clamped; 1 injured.

May 27, 1919, locomotive 606, Toulon, Ill. Grate shaker rod improperly connected, permitting front end of connecting link to drop down, while locomotive was running and fireman shaking grates; 1 killed.

June 3, 1919, locomotive 207, Armourdale, Kans. Case blew off of safety valve, while valve was being set, due to material in case having been reduced in thickness to one thirty-second inch when it was turned up in lathe; 1 injured.

*June 5, 1919, locomotive 2501, White City, Kans. Injured while operating shaker bar, due to bolt breaking; 1 injured.

June 24, 1919, locomotive 1294, Herington, Kans. Studs worked out of driver brake hanger bracket, allowing bracket to come in contact with transmission bar hanger, causing reverse lever to become unlatched and go into forward motion; 1 injured.

Twenty-two accidents; 1 killed, 22 injured.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA RAILROAD:

September 22, 1918, locomotive 178, Sioux City, Iowa. Lubricator glass burst; 1 injured.

*December 29, 1918, locomotive 389, Augusta, Wis. Reverse lever slipped out of quadrant, due to weak spring; 1 injured.

Two accidents; 2 injured.

CHICAGO, TERRE HAUTE & SOUTHEASTERN RAILROAD:

February 18, 1919, locomotive 211, Odon, Ind. Water glass burst; cut by flying glass; water glass shield escape pipe too short; 1 injured.

One accident; 1 injured.

CINCINNATI NORTHERN RAILROAD:

August 10, 1918, locomotive 6151, Park, Ohio. Lubricator filling plug blew out; threads crossed; 1 injured.

One accident; 1 injured.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILROAD:

October 8, 1918, locomotive 6414, Bellefontaine, Ohio. Arch-tube washout plug blew out; attempted to tighten under pressure; 1 injured.

December 4, 1918, locomotive 6105, (U. S.), near Farmland, Ind. Crown sheet failure; low water; water racing through water glass, rendering correct reading impossible

while working steam; gauge cocks leaking badly, filling cab with steam; had been reported three times previous to accident; 2 injured.

June 30, 1919, locomotive 6308, Silver Creek, Ohio. Nuts worked off cylinder cock rigging bracket bolts, permitting bracket to fall; nuts insecurely applied; 1 injured.

Three accidents; 4 injured.

CUMBERLAND VALLEY RAILROAD:

July 28, 1918, locomotive 80, near Lees Cross Roads, Pa. Crown sheet failure; low water; bottom water glass cock closed by rubber gasket; gauge cock drip stopped up and full of water; 2 injured.

One accident; 2 injured.

DELAWARE & HUDSON RAILROAD:

*August 15, 1918, locomotive 820, Barnesville, N. Y. Fireman's drop seat broke, permitting fireman to fall out of gangway; 1 injured.

August 24, 1918, locomotive 454, near South Scranton, Pa. Flue broke at weld; old fracture in flue, and overheated in welding; 1 killed.

October 20, 1918, locomotive 799, Carbondale, Pa. Crown sheet failure; low water; no contributory causes found; 1 killed, 1 injured.

November 6, 1918, locomotive 779, Canada Junction, N. Y. Crown sheet failure; low water; no contributory causes found; 1 killed, 1 injured.

November 29, 1918, locomotive 1032, Schenectady, N. Y. Nuts lost off inverted drawbar retaining plate, permitting drawbar pin to fall out and locomotive and tender to separate; 1 injured.

December 11, 1918, locomotive 740, Whitehall, N. Y. Gangway chain between engine and tender broke; 1 injured.

January 22, 1919, locomotive 1612, near Arrat, Pa. Flue broke at weld; overheated in welding; 1 injured.

February 1, 1919, locomotive 453, near Watervliet, N. Y. Seat in cab gave away, causing engineer to fall; screws holding seat support in place gave away; 1 injured.

February 13, 1919, locomotive 728, Fort Edward, N. Y. Bull's-eye lubricator glass blew out; 1 injured.

April 17, 1919, locomotive 1059, Wilkes-Barre, Pa. Inspirator steam pipe spanner nut broke; nut defective, due to use of hammer and set in tightening at previous times; 2 injured.

Ten accidents; 3 killed, 10 injured.

DELAWARE, LACKAWANNA & WESTERN RAILROAD:

September 28, 1918, locomotive 1160, Delawanna, N. J. Flue broke, due to accumulation of slag on interior, causing deterioration; 1 injured.

February 9, 1919, locomotive 1171, Factoryville, Pa. Squirt hose burst; hose defective, due to having been burned; 1 injured.

March 21, 1919, locomotive 746, near Cresco, Pa. Crown sheet failure; low water; appurtenances destroyed to such an extent that their condition could not be determined; 3 killed.

Three accidents; 3 killed, 2 injured.

DENVER & RIO GRANDE RAILROAD:

October 11, 1918, locomotive 647, Richfield, Utah. Injured while attempting to shake grates; grates improperly installed; no stops provided to prevent grate bearers from moving endwise; 1 injured.

March 3, 1919, locomotive 1147, Salt Lake City, Utah. Fountain valve bonnet blew out; threads on bonnet and in fountain defective; 1 injured.

Two accidents; 2 injured.

DENVER & SALT LAKE RAILROAD:

January 22, 1919, locomotive 100, near Dixie Lake, Colo. Crown sheet failure; low water; bottom water glass cock nearly stopped up with scale and sediment; right tank hose strainer missing; safety valves would not properly relieve pressure; 2 killed, 1 injured.

One accident; 2 killed, 1 injured.

EL PASO & SOUTHWESTERN SYSTEM:

September 2, 1918, locomotive 204, Tyrone, N. Mex. Nut on injector delivery pipe broke; 1 injured.

April 18, 1919, locomotive 391, (U. S.), Rita, Ariz. Crown sheet failure; low water; no contributory causes found; 2 injured.

Two accidents; 3 injured.

ERIE RAILROAD:

July 23, 1918, locomotive 513, Hasbrouck Heights, N. J. Side rod broke; old flaw in rod; 1 injured.

August 10, 1918, locomotive 3050, Rosas, Pa. Handle on firebox door became disconnected; 1 injured.

August 16, 1918, locomotive 80, Akron, Ohio. Flue broke at weld; overheated in welding; 1 injured.

August 17, 1918, locomotive 3127, Weimmers, Pa. Crown sheet failure; low water; no contributory causes found; 2 injured.

August 17, 1918, locomotive 1459, Buffalo, N. Y. Brake beam hanger lug disconnected from channel iron on tender, due to bolt coming out of lug, allowing brake beam to come down; 1 injured.

September 27, 1918, locomotive 1052, East Buffalo, N. Y. Shaker bar slipped off post; lug on shaker bar post casting, preventing shaker bar from forming proper fit; 1 injured.

October 17, 1918, locomotive 4100, Kent, Ohio. Crown sheet failure; low water; gauge cock drip stopped up; 4-inch welded crack in top rear flue sheet flange leaking badly; reported three times just previous to accident; mud ring leaking at right front corner; reported 11 times just previous to accident, and repairs not made; 1 injured.

*October 19, 1918, locomotive 4037, Marion, Ohio. Handhold on locomotive broke; 1 injured.

November 18, 1918, locomotive 1559, Mast Hope, Pa. Air pipe connection between triple valve and auxiliary reservoir broke; 1 injured.

November 28, 1918, locomotive 1858, Cleveland, Ohio. Crown sheet failure; scale formation one-eighth inch thick on crown sheet, and three-eighths inch thick at base of crown bolts, causing bolt heads to become overheated; gauge cock drip stopped up; 2 injured.

December 20, 1918, locomotive 724, Meadville, Pa. Smoke box not equipped with step, causing engineer to fall while working on headlight; 1 injured.

December 22, 1918, locomotive 1630, Binghamton, N. Y. Injector delivery pipe spanner nut failed; defective spanner nut, due to use of hammer and set in tightening at previous times; 1 injured.

December 25, 1918, locomotive 1602, Salamanca, N. Y. Locomotive became uncoupled from train, due to rear coupler being 36 inches from rail, (one and one-half inches too high), causing air to apply in emergency, resulting in engineer on pusher locomotive to be thrown through front cab door; 1 injured.

January 16, 1919, locomotive 3128, Rowlands, Pa. Flue broke at weld; overheated in welding; 2 injured.

February 15, 1919, locomotive 1875, near Suffern, N. Y. Injector steampipe broke at throttle connection, due to defective brazing; pipe not properly braced; 2 injured.

May 2, 1919, locomotive 1743, Huntington, Ind. Coupler knuckle on rear of tender broke; flaw in knuckle; 1 injured.

**May 9, 1919, locomotive 956, Newark Junction, N. J. Injector delivery pipe spanner nut broke; nut cut entirely through to threads, in places, due to previous use of hammer and chisel in tightening; 1 injured.

June 4, 1919, locomotive 2053, Ohio City, Ohio. Washout plug blew out of front flue sheet; threads worn out in sheet; 1 injured.

*June 13, 1919, locomotive 1830, Secaucus, N. J. Handhold on front end pulled off; 1 injured.

Nineteen accidents; 23 injured.

FLORIDA EAST COAST RAILROAD:

*May 12, 1919, locomotive 69, Hobe Sound, Fla. Reverse lever became unlatched, due to spring coming out; 1 injured.

One accident; 1 injured.

FORT WORTH & DENVER CITY RAILROAD:

June 13, 1919, locomotive 253, Avondale, Tex. Crown sheet failure; low water; no contributory causes found; 2 killed.

One accident; 2 killed.

GEORGIA SOUTHERN & FLORIDA RAILROAD:

April 16, 1919, locomotive 1089, Fargo, Ga. Shaker bar slipped off lever, due to improper fit; 1 injured.

One accident; 1 injured.

GRAND RAPIDS & INDIANA RAILROAD:

August 6, 1918, locomotive 86, Cadillac, Mich. Air pump throttle valve bonnet was unscrewed in attempt to open valve; 1 injured.

One accident; 1 injured.

GREAT NORTHERN RAILROAD:

July 29, 1918, locomotive 3032, Rothsay, Minn. Fill-up cap on injector delivery pipe blew off; threads stripped; 1 injured.

July 29, 1918, locomotive 1134, Askov, Minn. Left injector steam pipe blew out of collar, due to defective brazing; 2 injured.

August 1, 1918, locomotive 1514, Oswego, Mont. Injured while attempting to pack valve stem on the road; valve stem packing blowing; 1 injured.

August 31, 1918, locomotive 1981, Kelly Lake, Minn. Broken rivet blew out of firebox side sheet while being calked under pressure; 1 injured.

October 7, 1918, locomotive 1709, Minot, N. Dak. Fill-up cap on injector delivery pipe blew off; attempted to tighten while injector was in operation; threads worn and defective; 1 injured.

November 8, 1918, locomotive 1951, near Bengal, Minn. Draft pipe in front end came loose and fell over exhaust nozzle, causing back draft, due to draft pipe bolts working out; 2 injured.

*November 14, 1918, locomotive 1979, Kerrick, Minn. Water glass burst; cut by flying glass; 1 injured.

*February 1, 1919, locomotive 1306, Tobacco, Mont. Injured due to defective drawbar connection; 1 injured.

February 3, 1919, locomotive 3008, Breckenridge, Minn. Washout plug blew out; threads on plug stripped, and plug improperly applied; 1 injured.

February 19, 1919, locomotive 1194, Dunkirk, Mont. Squirt hose blew off; hose insecurely clamped; 1 injured.

**February 25, 1919, locomotive 831, Leavenworth, Wash. Footboard broke off outside of hanger, due to being too long; 1 injured.

March 16, 1919, locomotive 3008, Grace City, N. Dak. Petticoat pipe became loose, turning at right angle, causing back draft, due to not being properly secured; one bolt for holding pipe in place had been previously cut away, and another worn and deteriorated to such extent as to permit bolt head to pull through hole; 2 injured.

**April 28, 1919, locomotive 1979, Sandstone, Minn. Squirt hose blew off; hose insecurely applied; 1 injured

Thirteen accidents; 16 injured.

GULF & SHIP ISLAND RAILROAD:

January 14, 1919, locomotive 60, Palmers, Miss. Flue broke, due to being worn thin; 3 injured.

One accident; 3 injured.

GULF, MOBILE & NORTHERN RAILROAD:

August 5, 1918, locomotive 75, Mossville, Miss. Blower valve bonnet broke off, due to old defect; 1 injured.

One accident; 1 injured.

ILLINOIS CENTRAL RAILROAD:

July 24, 1918, locomotive 499, Parkersburg, Iowa. Squirt hose blew off; hose insecurely clamped; 1 injured.

September 12, 1918, locomotive 753, Bloomfield, Ind. Tubular water glass burst; cut by flying glass; shield removed at time of accident; 1 injured.

October 3, 1918, locomotive 170, Waterloo, Iowa. Crown sheet failure; accumulation of scale $\frac{1}{8}$ inch to $\frac{3}{8}$ inch in thickness on crown sheet; 1 injured.

*November 19, 1918, locomotive 77, Champaign, Ill. Cylinder head blew out; 1 injured.

December 2, 1918, locomotive 678, Chicago, Ill. Crown sheet failure; low water; no contributory causes found; 2 injured.

December 8, 1918, locomotive 2042, Nashua, Iowa. Shaker bar slipped off lever; pin missing from shaker bar; 1 injured.

December 17, 1918, locomotive 928, Council Bluffs, Iowa. Flue pocket blew out of front flue sheet; 1 injured.

January 6, 1919, locomotive 927, Clover Hill, Miss. Squirt pipe coupling nut blew off, due to defective threads on pipe; 1 injured.

March 16, 1919, locomotive 751, Chicago, Ill. Handhold on locomotive came in contact with tender floor while rounding curve, due to tender floor extending out too far; 1 injured.

April 30, 1919, locomotive 1541, Vandalia, Ill. Lid of supply box on tender gave away, due to broken hinges, permitting fireman to fall to ground; 1 injured.

*May 23, 1919, locomotive 848, McComb, Miss. Scalded by hot water from defective squirt hose; 1 injured.

Eleven accidents; 12 injured.

INDIANA HARBOR BELT RAILROAD:

January 1, 1919, locomotive 253, Blue Island, Ill. Crown sheet failure; low water; bottom of water glass partially stopped up by rubber gasket; top water glass cock practically closed, and improperly located; 2 injured.

**March 28, 1919, locomotive 28, Norpaul, Ill. Reverse lever slipped out of quadrant, due to weak latch spring; 1 injured.

June 13, 1919, locomotive 28, Grasselli, Ind. Defective injector and leaky boiler check, rendering injector difficult to operate; fireman scalded by hot water from squirt hose in attempt to operate injector; 1 injured.

Three accidents; 4 injured.

INTERNATIONAL & GREAT NORTHERN RAILROAD:

December 26, 1918, locomotive 122, Anchor, Tex. Water glass burst; scalded while attempting to close water glass cocks, due to top cock being stuck and difficult to operate; 1 injured.

January 15, 1919, locomotive 243, Gould, Tex. Boiler check stuck open; engineer attempted to seat check by opening squirt hose valve, at which time hose burst; 1 injured.

Two accidents; 2 injured.

KANAWHA & MICHIGAN RAILROAD:

**July 22,1918, locomotive 570, near Arbuckle, W. Va. Eccentric rod broke; 1 injured.

One accident; 1 injured.

KANSAS CITY SOUTHERN RAILROAD:

*October 23, 1918, locomotive 63, Texarkana, Tex. Injured due to defective boiler check; 1 injured.

One accident; 1 injured.

LEHIGH & HUDSON RIVER RAILWAY:

*November 3, 1918, locomotive 72, Sparta Junction, N. J. Grab iron broke off of cab; 1 injured.

December 30, 1918, locomotive 51, near Farmingdale, N. Y. Main side rod connection strap broke, stripping locomotive; old flaw in strap; 1 injured.

Two accidents; 2 injured.

LEHIGH VALLEY RAILROAD:

September 5, 1918, locomotive 908, near Longwood, N. Y. Crown sheet failure; low water; no contributory causes found; 3 killed.

December 1, 1918, locomotive 4018, near Odessa, N. Y. Crown sheet failure; low water; no contributory causes found; 1 injured.

*February 3, 1919, locomotive 1594, Seneca, N. Y. Rod supporting cab seat broke; 1 injured.

Three accidents; 3 killed, 2 injured.

LOUISVILLE & NASHVILLE RAILROAD:

July 6, 1918, locomotive 133, near Chapel Hill, Tenn. Crown sheet failure; low water; no contributory causes found; 1 injured.

August 6, 1918, locomotive 1234, near Gallatin, Tenn. Reverse lever quadrant bracket stud blew out; threads on stud and in sheet badly worn; quadrant had been reported July 22, 30, August 4 and 5; 2 injured.

August 7, 1918, locomotive 1291, Calera, Ala. Scalded while operating ashpan blower diverting valve; valve leaking around stem; 1 injured.

October 13, 1918, locomotive 1086, Boyles, Ala. Ashpan blower pipe blew off; threads defective, and union nut too large; 1 injured.

November 21, 1918, locomotive 1350, near Crofton, Ky. Crown sheet failure; low water; no contributory causes found; 3 injured.

*February 5, 1919, locomotive 1133, Upton, Ky. Defective step on engine, causing fireman to fall; 1 injured.

*March 15, 1919, locomotive 766, New Orleans, La. Lubricator drain cock broke off; 1 injured.

*March 29, 1919, locomotive 959, Guthrie, Ky. Injured while shaking grates, due to reach rod breaking; 1 injured.

June 7, 1919, locomotive 740, (N. C. & St. L.), Nashville, Tenn. Fireman's foot caught, while locomotive was rounding curve, between cab apron and block that had been nailed to tender deck to close hole in deck; 1 injured.

Nine accidents; 12 injured.

MAINE CENTRAL RAILROAD:

*February 20, 1919, locomotive 362, Stevens, Vt. Eccentric strap bolts broke, causing reverse lever to fly out of quadrant; 1 injured.

One accident; 1 injured.

MICHIGAN CENTRAL RAILROAD:

April 15, 1919, locomotive 8309, near Michigan City, Ind. Flue blew out, due to defective bead, caused by excessive working and flue not being properly rolled in front flue sheet; 2 injured.

One accident; 2 injured.

MISSOURI, KANSAS & TEXAS RAILROAD:

*October 8, 1918, locomotive 364, Sedalia, Mo. Injector throttle bonnet blew off, due to bonnet being too small for valve fit; 1 injured.

November 8, 1918, locomotive 638, near Kansas City, Kans. Crown sheet failure; low water: appurtenances destroyed to such extent at time of accident that their previous condition could not be determined; 3 killed.

*February 14, 1919, locomotive 912, Belcherville, Tex. Shaker bar broke; 1 injured.

**March 11, 1919, locomotive 511, Houston, Tex. Water glass burst; cut by flying glass; shield removed at time of accident; 1 injured.

April 24, 1919, locomotive 520, near Parker, Kans. Squirt hose parted at splice, due to not being properly secured; 1 injured.

*June 14, 1919, locomotive 819, Merriam, Kans. Cylinder casing flew off; 3 injured.

Six accidents; 3 killed, 7 injured.

MISSOURI PACIFIC RAILROAD:

*July 25, 1918, locomotive 1808, Russellville, Ark. Squirt hose burst; 1 injured.

*July 29, 1918, locomotive 9538, Kansas City, Mo. Squirt hose burst; 1 injured

*August 14, 1918, locomotive 1226, Kansas City, Mo. Squirt hose blew off; 1 injured.

*September 16, 1918, locomotive 3612, Batesville, Ark. Squirt hose burst; 1 injured.

September 21, 1918, locomotive 2, Mayflower, Ark. Squirt hose burst; 1 injured.

*December 7, 1918, locomotive 457, McGehee, Ark. Squirt hose burst; 1 injured.

*December 8, 1918, locomotive 462, Noble, Kans. Squirt hose burst; 1 injured.

December 17, 1918, locomotive 532, North Little Rock, Ark. Burned by hot oil from lubricator, due to valve leaking; 1 injured.

*December 23, 1918, locomotive 9411, St. Louis, Mo. Fire-door chain broke; 1 injured.

*January 5, 1919, locomotive 80, North Little Rock, Ark. Squirt hose burst; 1 injured.

*January 27, 1919, locomotive 7513, Rixey, Ark. Water glass burst; cut by flying glass; 1 injured.

February 1, 1919, locomotive 507, Wynne, Ark. Shaker bar slipped off lever, due to improper fit of bar on lever; 1 injured.

*February 4, 1919, locomotive 410, McGehee, Ark. Main air reservoir burst; 1 injured.

February 11, 1919, locomotive 2326, near Grady, Ark. Injured while shaking grates, due to loose fit of shaker bar on lever; 1 injured.

*February 20, 1919, locomotive 6422, Ironton, Mo. Side rod collar bolt on front end broke, permitting side rod to come off pin; 1 injured.

*February 22, 1919, locomotive 1274, Bushang, Kans. Drawbar between locomotive and tender broke; 1 injured.

March 7, 1919, locomotive 2355, McGehee, Ark. Engineer's hand caught between reverse lever and jacket of back head; jacket not secured in place and jacket band loose; 1 injured.

March 29, 1919, locomotive 517, Belknap, Ark. Scalded by hot water from loose coupling of injector overflow pipe; 1 injured.

April 14, 1919, locomotive 9463, North Little Rock, Ark. Scalded while operating ashpan blower valve; handle improperly applied; 1 injured.

*April 16, 1919, locomotive 2395, Alexandria, La. Hand caught between reverse lever and injector feed pipe; bolt in front end of quadrant came out, permitting lever to go too far ahead; 1 injured.

April 16, 1919, locomotive 6519, near Kimmswick, Mo. Throttle latch slipped out of quadrant; 1 injured.

May 3, 1919, locomotive 2517, Geneseo, Kans. Release valve blew out; 1 injured

May 4, 1919, locomotive 57, Benton, Ark. Water glass burst; cut by flying glass; inefficient shield; 1 injured.

*May 7, 1919, locomotive 9437, Omaha, Nebr. Footboard on engine broke; 1 injured.
May 17, 1919, locomotive 2667, Roper, Kans. Lubricator glass broke; scalded by escaping steam and hot water; 1 injured.
June 10, 1919, locomotive 12, near Montrose, Ark. Injured while operating automatic fire door, due to lever being bent; 1 injured.
**June 13, 1919, locomotive 6503, Russelville, Ark. Injured while operating ashpan blower valve; due to packing nut leaking; 1 injured.
June 23, 1919, locomotive 7521, North Little Rock, Ark. Scalded by hot water emitting from steam heat line, at intervals, due to steam heat throttle leaking; 1 injured
Twenty-eight accidents; 28 injured.

MOBILE & OHIO RAILROAD:

*August 8, 1918, locomotive 20, Tuscaloosa, Ala. Expansion pad stud blew out; 1 injured.
One accident; 1 injured.

MONONGAHELA RAILROAD:

November 3, 1918, locomotive 128, Leckrone, Pa. Water glass burst; cut by flying glass; inefficient shield; 1 injured.
June 18, 1919, locomotive 146, Huron, Pa. Water glass burst; cut by flying glass; inefficient shield; 1 injured.
Two accidents; 2 injured.

NASHVILLE, CHATTANOOGA & ST. LOUIS RAILROAD:

October 18, 1918, locomotive 800, Adairsville, Ga. Back section of right side rod broke, due to old flaw and crystallization of rod; 1 injured.
November 5, 1918, locomotive 118, Gorman, Tenn. Right valve stem key lost out, causing reverse lever to fly out of quadrant; 1 injured.
Two accidents; 2 injured.

NEW YORK CENTRAL RAILROAD—LINES EAST:

July 6, 1918, locomotive 3770, Pierpoint Manor, N. Y. Crown sheet failure; low water; crown sheet showed evidence of previous overheating, and practically all crown bolts heavily calked; 3 injured.
July 26, 1918, locomotive 3008, Maynard Crossing, N. Y. Squirt hose blew off; hose insecurely applied; 1 injured.
August 16, 1918, locomotive 1746, Geneva, N. Y. Spindle to shut-off valve of boiler check failed while attempting to close valve; 1 injured.
August 20, 1918, locomotive 3078, Tellers Siding, N. Y. Injector delivery pipe burst at brazing; defective brazing; 2 injured.
September 12, 1918, locomotive 3360, near Albany, N. Y. Crown sheet failure; low water; bottom opening of water glass almost closed with rubber gasket; left tank strainer partially stopped up; 2 injured.
September 12, 1918, locomotive 2565, near Fonda, N. Y. Crown sheet failure; low water; no contributory causes found; 2 killed, 1 injured.
October 15, 1918, locomotive 2542, Ridgeland, N. Y. Crown sheet failure; low water; no contributory causes found; 1 killed, 1 injured.
November 29, 1918, locomotive 3408, Savannah, N. Y. Flue broke, due to being wasted away at point of fracture to only $\frac{1}{32}$ inch in thickness; 1 injured.
December 3, 1918, locomotive 2667, St. Johnsville, N. Y. Flue broke at weld; overheated in welding; 1 injured.
January 2, 1919, locomotive 3887, West Albany, N. Y. Relief valve stud blew out; threads on stud stripped; 1 injured.
January 20, 1919, locomotive 3906, near Alabama, N. Y. Crown sheet failure; low water; water glass inoperative, due to being stopped up at bottom end, and partially closed at top end by rubber gaskets; 1 killed, 2 injured.
February 18, 1919, locomotive 3600, Corning, N. Y. Injector delivery pipe spanner nut broke while attempting to tighten with hammer and set; nut distorted, due to previous use of hammer and set in tightening; 1 injured.
May 16, 1919, locomotive 669, West Albany, N. Y. Washout plug blew out; plug not properly applied after washing boiler; 1 injured.
May 20, 1919, locomotive 3336, Buffalo, N. Y. Arch tube washout plug blew out; attempted to tighten under pressure; threads on plug stripped; 2 injured.
June 3, 1919, locomotive 3659, Minoa, N. Y. Squirt hose parted at splice; hose not clamped; 1 injured.
June 19, 1919, locomotive 5168, (U. S.), near DeKalb Junction, N. Y. Crown sheet failure; low water; right water glass blowoff cock connection stopped up with scale; 2 injured.
Sixteen accidents; 4 killed, 23 injured.

NEW YORK CENTRAL RAILROAD—LINES WEST:

July 8, 1918, locomotive 5689, near Parma, Ohio. Crown sheet failure; low water; top water glass cock found only one-eighth of a turn open at time of investigation; right tank hose strainer missing; 1 injured.
August 2, 1918, locomotive 3944, Elyria, Ohio. Squirt hose parted at splice; hose not clamped; 1 injured.
August 5, 1918, locomotive 3961, Wesleyville, Pa. Injured while using defective squirt hose; 1 injured.
August 7, 1918, locomotive 5903, Ashtabula, Ohio. Squirt hose blew off; hose not clamped; 1 injured.
August 21, 1918, locomotive 5830, Westfield, N. Y. Squirt hose blew off; hose not clamped; 1 injured.
*December 2, 1918, locomotive 3605, Derby, N. Y. Shaker lever broke at weld; 1 injured.
December 2, 1918, locomotive 4808, Buffalo, N. Y. Steam heat valve bonnet not properly tightened; bonnet screwed off while attempting to open valve; 1 injured.
*December 29, 1918, locomotive 3622, Tioga, Pa. Locomotive moved, due to leaky throttle; 1 injured.
February 15, 1919, locomotive 2607, Wesleyville, Pa. Water glass burst; cut by flying glass; inefficient shield; 1 injured.
February 19, 1919, locomotive 1377, Newberry, Pa. Water glass burst; cut by flying glass; inefficient shield; 1 injured.
*April 2, 1919, locomotive 5787, Eaton Rapids, Mich. Arm rest gave way, due to screws breaking; 1 injured.
April 28, 1919, locomotive 9559, (T. & O. C.), Bucyrus, Ohio. Washout plug broke off at thread while attempting to tighten under pressure; defective material in plug; 1 injured.
June 5, 1919, locomotive 4825, Chicago, Ill. Washout plug blew out; attempted to tighten under pressure; defective threads on plug and in sheet and plug cross-threaded; 1 injured.
June 22, 1919, locomotive 5699, near North Judson, Ind. Injector steam pipe collar broke, due to collar being too light, and defective brazing; 1 injured.
Fourteen accidents; 14 injured.

NEW YORK, CHICAGO & ST. LOUIS RAILROAD:

November 29, 1918, locomotive 32, Buffalo, N. Y. Reverse lever slipped out of quadrant; set screws in adjusting plate loose; 1 injured.
*March 6, 1919, locomotive 55, Conneaut, Ohio. Handhold on front of engine gave way while employee was attempting to get on footboard while engine was in motion; 1 injured.
April 2, 1919, locomotive 602, (U. S.), near Angola, N. Y. Crown sheet failure; low water; right water glass shield cracked, and both water glasses dirty, rendering reading of water difficult; 1 injured.
*April 5, 1919, locomotive 429, Glasgow, Ind. Scalded, due to leaky staybolt; 1 injured.
Four accidents; 4 injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

**July 12, 1918, locomotive 976, Readville, Mass. Injured while operating reverse lever; spring too weak to hold lever in quadrant; 1 injured.
September 5, 1918, locomotive 1339, Midway, Conn. Handrail extending over smoke arch of boiler pulled out; handrail improperly constructed; 1 injured.
**September 13, 1918, locomotive 724, near Columbia, Conn. Right go-ahead eccentric strap broke, due to loose strap bolt; 1 injured.
September 18, 1918, locomotive 361, Plainville, Conn. Injured while operating reverse lever; insufficient clearance between reverse lever and air gauge, with lever in extreme forward motion; 1 injured.
**November 5, 1918, locomotive 2382, Oak Point, N. Y. Lubricator filling plug blew out while attempting to tighten under pressure; 1 injured.
January 4, 1919, locomotive 152, (C. N. E.), Putnam, Conn. Scalded by hot water from union in ash-pan blower; nut on union not tight; 1 injured.
January 12, 1919, locomotive 1304, Saybrook Junction, Conn. Injured while operating reverse lever; lever difficult to operate, due to check nuts on counterbalance being loose; 1 injured.
January 17, 1919, locomotive 3001, Columbia, Conn. Oil pipe to air reverse cylinder broke; 1 injured.

April 2, 1919, locomotive 3021, near Avon, Conn. Flue broke; flue thinned at point of failure, due to use of expander; 3 injured.

April 3, 1919, locomotive 1002, Willimantic, Conn. Blower pipe in front end became disconnected, causing back draft; defective threads on pipe and coupling nut; 1 injured.

April 8, 1919, locomotive 534, Brockton, Mass. Lubricator plug blew out; threads on plug and in lubricator badly worn; 1 injured.

**April 12, 1919, locomotive 2391, New Bedford, Mass. Injured while shaking grates, due to pin losing out of forward section of grate lever; 1 injured.

May 4, 1919, locomotive 1025, South Boston, Mass. Ash-pan blower pipe became disconnected at elbow; threads on elbow badly worn and corroded; 1 injured.

May 8, 1919, locomotive 2511, Boston, Mass. Locomotive and tender parted from train, due to coupler casting on rear of tender breaking; defect reported twice immediately preceding accident and repairs not made; 1 injured.

May 14, 1919, locomotive 1278, near Tolles, Conn. Flue broke at weld; defective weld; 1 injured.

May 22, 1919, locomotive 2334, Boston, Mass. Reverse lever spring broke, causing lever to go into forward motion; 1 injured.

June 27, 1919, locomotive 397, Taunton, Mass. Scalded while operating ash-pan blower valve, due to union nut connection having worked loose; 1 injured.

Seventeen accidents; 19 injured.

NEW YORK, ONTARIO & WESTERN RAILROAD:

August 11, 1918, locomotive 307, near Karrys, N. Y. Arch tube pulled out of flue sheet; tube did not extend through sheet far enough to permit beading; 1 killed; 3 injured.

November 16, 1918, locomotive 140, Westmoreland, N. Y. Top section of left side rod strap broke at main connection, stripping locomotive; old defect in strap; 1 injured.

November 29, 1918, locomotive 203, Old Morsten, N. Y. Right main rod broke, due to crystallization; rod had been repaired by welding, 5½ inches from point of fracture, at some previous time; 1 injured.

December 4, 1918, locomotive 227, Livingston Manor, N. Y. Squirt hose blew off; defective hose; 1 injured.

Four accidents; 1 killed, 6 injured.

NEW YORK, SUSQUEHANNA & WESTERN RAILROAD:

August 24, 1918, locomotive 113, Little Ferry, N. J. Lubricator filling glass and nut blew out; old crack in nut; 1 injured.

One accident; 1 injured.

NORFOLK & WESTERN RAILROAD:

August 25, 1918, locomotive 440, near Rocky Mount, Va. Right side rod broke; old fracture in rod; rods reported defective seven times previous to accident; 1 injured.

*September 3, 1918, locomotive 1054, Abingdon, Va. Left link yoke broke, due to old defect, stripping locomotive; 1 injured.

*September 8, 1918, locomotive 406, Roanoke, Va. Bolt in drawhead on locomotive broke; 1 injured.

October 12, 1918, locomotive 728, Hull, W. Va. Right back side rod collar bolt broke, permitting side rod to come off pin; 1 injured.

*October 27, 1918, locomotive 1405, Roanoke, Va. Ash-pan blower valve bonnet blew out, due to pipe being stopped up; 1 injured.

January 1, 1919, locomotive 403, Gillespie, Va. Drawbar pin between locomotive and tender broke; old fracture in pin; safety chains failed to hold, due to both eye-bolt nuts missing; 1 killed.

January 6, 1919, locomotive 561, Dewey, Va. Drawbar pin between locomotive and tender lost out, due to bolts in retaining plate missing; excessive slack in safety chains, and cab apron of insufficient width; 1 injured.

**February 11, 1919, locomotive 388, near Madison, N. C. Reverse lever slipped out of quadrant; 1 injured.

**March 22, 1919, locomotive 1408, Bluefield, W. Va. Wheel pulled off of air pump throttle handle, causing employee to fall; nut on throttle stem missing; 1 injured.

March 23, 1919, locomotive 709, Graham, Va. Arch tube pulled out of door sheet; tube did not extend far enough through sheet to permit of proper beading, and heavy scale formation in tube; 2 injured.

April 4, 1919, locomotive 454, Glade Springs, Va. Reverse lever slipped out of quadrant; spring too weak to hold latch in place; 1 injured.

April 10, 1919, locomotive 64, Eckman, W. Va. Flue broke at weld; defective butt weld; 1 injured.

May 19, 1919, locomotive 596, near Wallace, Va. Flue broke at weld; defective butt weld; 1 injured.

Thirteen accidents; 1 killed, 13 injured.

NORFOLK SOUTHERN RAILROAD:

*October 17, 1918, locomotive 211, Middlesex, N. C. Drawbar pin between locomotive and tender worked out; pin not provided with cotter key; 1 injured.

One accident; 1 injured.

NORTHERN PACIFIC RAILROAD:

August 16, 1918, locomotive 1904, Spiritwood, N. Dak. Main crank pin broke; old fracture in pin; 1 injured.

**October 5, 1918, locomotive 2089, Prosser, Wash. Rod connecting ash-pan slides became disconnected, due to bolt losing out; 1 injured.

October 30, 1918, locomotive 969, Seattle, Wash. Injured while attempting to uncouple locomotive from car, due to broken lock link on front coupler of locomotive; 1 injured.

November 10, 1918, locomotive 1128, Parkwater, Wash. Oil headlight exploded while being lighted; 1 injured.

January 11, 1919, locomotive 1673, Ellensburg, Wash. Air-operated fire door inoperative, due to handle of air supply valve broken off, and shoulder worn on bottom horizontal roller guide; 1 injured.

January 23, 1919, locomotive 139, near Fallon, Mont. Arch tube pulled out of flue sheet; tube overheated, due to accumulation of scale, caused by use of improper cleaner; tube not belled or beaded in sheet; 1 killed.

March 27, 1919, locomotive 2206, Mandan, N. Dak. Injured while operating pneumatic fire door; door difficult to operate; 1 injured.

April 27, 1919, locomotive 1208, Auburn, Wash. Injector delivery pipe coupling nut blew off; nut too large; 1 injured.

**May 16, 1919, locomotive 1742, Garrison, Mont. Stem of air valve to fire door broken off; injured in attempt to fasten fire door open with file; 1 injured.

**June 14, 1919, locomotive 1716, Clinton, Mont. Plug missing from bottom of air cylinder to fire door, rendering fire door inoperative; fireman injured while attempting to make repairs; 1 injured.

Ten accidents; 1 killed, 9 injured.

OREGON SHORT LINE RAILROAD:

**February 14, 1919, locomotive 2540, (U. S.), Cokeville, Wyo. Insufficient clearance between grate-shaker carrier and cab floor, causing engineer's foot to be mashed; 1 injured.

May 22, 1919, locomotive 4105, near Harper, Oreg. Squirt hose parted at splice; hose insecurely clamped; 1 injured.

Two accidents; 2 injured.

OREGON-WASHINGTON RAILROAD & NAVIGATION:

*October 13, 1918, locomotive 2163, Meacham, Oreg. Squirt hose blew off pipe; 1 injured.

One accident; 1 injured.

PENNSYLVANIA RAILROAD—WESTERN LINES:

July 6, 1918, locomotive 887, (A. T. & S. F.), Port Washington, Ohio. Flue broke at weld; overheated in welding; 1 injured.

**July 11, 1918, locomotive 7025, near Conway, Pa. Superheater unit broke; 1 injured.

July 27, 1918, locomotive 8644, Newcomerstown, Ohio. Flue broke at weld; improperly welded; 1 injured.

July 29, 1918, locomotive 8345, Richmond, Ind. Broken rivet blew out of flue sheet; 1 injured.

August 5, 1918, locomotive 9075, Allegheny, Pa. Main air reservoir drain cock blew out, due to defective threads in sheet; 1 injured.

August 11, 1918, locomotive 7347, Allegheny, Pa. Flue broke at weld; overheated in welding; 1 injured.

September 14, 1918, locomotive 3948, (N. Y. C.), Alliance, Ohio. Bull's-eye lubricator glass broke; 1 injured.

September 22, 1918, locomotive 7620, New Philadelphia, Ohio. Injector overflow pipe stud blew out; 1 injured.

November 24, 1918, locomotive 7144, Conway, Pa. Washout cap blew off; attempted to tighten under pressure; defective threads and loose fit; 1 injured.

December 15, 1918, locomotive 7609, Allegheny, Pa. Steam fountain burst; top of wall only $\frac{5}{32}$ inch in thickness; 1 injured.

December 17, 1918, locomotive 7786, Bayard, Ohio. Flue broke near weld; overheated in welding; 1 injured.

December 28, 1918, locomotive 9859, Holmesville, Ohio. Whistle blew out; defective threads at connection in dome; 1 injured.

*December 30, 1918, locomotive 7382, Conway, Pa. Injured while operating reverse lever, due to throttle leaking; 1 injured.

*January 8, 1919, locomotive 7779, West Bellevue, Pa. Brake shoe came off and flew from engine while in motion; 2 injured.

*January 10, 1919, locomotive 7538, Chicago, Ill. Flue broke, scalding fireman; 1 injured.

*January 11, 1919, locomotive 8741, Gaskill, Ind. Expansion-pad stud blew ut; threads on stud stripped, and stud defective; 1 injured.

*January 17, 1919, locomotive 7001, Conway, Pa. Flue broke, due to defective weld; 1 injured

*January 17,1919, locomotive 9738, Circleville, Ohio. Injured while shaking grates, due to bolt breaking; 1 injured.

January 27, 1919, locomotive 3948, (N. Y. C.), near Massillon, Ohio. Reverse lever went into full forward position when engineer attempted to adjust it, catching his foot between lever and air pipe, due to insufficient clearance; 1 injured.

*February 11, 1919, locomotive 9072, Hamlet, Ind. Bolts in front end of lower guide bar came out, permitting bar to drop, breaking guide yoke, tumbling rod, and quardant; 1 injured.

*March 3, 1919, locomotive 9040, Coverts, Pa. Footboard on engine broke; 1 injured.

March 21,1919, locomotive 7231, Massillon, Ohio. Washout cap blew off while attempting to tighten under pressure; 1 injured.

*April 3, 1919, locomotive 9895, Milford Center, Ohio. Crosshead on engine broke; 1 injured.

April 23, 1919, locomotive 7790, Chicago, Ill. Superheater tubes cracked where welded to back flue sheet; 1 injured

May 25, 1919, locomotive 6151, (C. B. & Q.), near East Palestine, Ohio. Crown sheet failure; low water; no contributory causes found; 2 killed, 1 injured.

*June 10, 1919, locomotive 7268, Chicago, Ill. Injured due to being struck by piece of eccentric strap which flew off engine; 1 injured.

June 13, 1919, locomotive 9929, Cleveland, Ohio. Fountain dry pipe disconnected at fountain valve in top of boiler head, allowing water to enter injector steam pipe, causing injector to break; 1 injured.

Twenty-seven accidents; 2 killed, 28 injured.

PENNSYLVANIA RAILROAD—EASTERN LINES:

July 16, 1918, locomotive 1145, near Marietta, Pa. Crown sheet failure; low water; accumulation of coal and cinders in both tank hose, and screening in tank well defective; 3 injured.

July 17, 1918, locomotive 1264, East Conemaugh, Pa. Flue broke at weld, due to corrosion; 2 injured.

July 23, 1918, locomotive 2176, Shire Oaks, Pa. Injector delivery pipe in cab split where repairs had been made by brazing patch; old defect; 1 injured.

July 26, 1918, locomotive 1579, Altoona, Pa. Crown sheet failure; low water; gauge cock drip stopped up; deposit of cinders and coal found in tank, due to right section of tank netting improperly fitted; tank well strainers defective; 2 injured.

August 7, 1918, locomotive 1189, Farwell, Pa. Flue broke at weld; defective weld; 1 injured.

August 10, 1918, locomotive 3321, Harrisburg, Pa. Arch-tube washout plug blew out while attempting to tighten under pressure; plug too small, with tapers differing on plug and in hole, and plug shouldered; 1 killed, 1 injured.

August 20, 1918, locomotive 4, near Lilly, Pa. Crown sheet failure; low water; Klinger type water glass improperly applied; extended too far into top water glass cock, restricting or closing top end of water glass opening; gauge cock drip stopped up; right injector feed pipe strainer partially stopped up; 3 injured.

August 25, 1918, locomotive 222, Pittsburgh, Pa. Squirt hose parted at splice; 1 injured.

September 13, 1918, locomotive 5255, near Stelton, N. J. Eccentric rod broke at weld; defective weld; 1 injured.

September 14, 1918, locomotive 997, Bristol, Pa. Left main driving axle broke; old flaw 60 per cent the cross-sectional area of axle; 1 injured.

September 17, 1918, locomotive 1531, Harrisburg, Pa. Washout cap blew off; cap cross-threaded; attempted to tighten under pressure; 1 injured.

October 21, 1918, locomotive 1024, Birdsboro, Pa. Injector steam pipe parted at collar connection, due to defective brazing; 1 injured.

November 18, 1918, locomotive 3381, East Liberty, Pa. Piston valve failed, due to broken packing ring dropping in port and jamming valve, breaking tie rods and stripping nut from end of piston rod, allowing bushing to blow out; 1 injured.

December 20, 1918, locomotive 2422, Bessemer, Pa. Lubricator steam pipe nut blew off of valve; defective threads on valve; nut enlarged sufficiently to permit threaded portion of valve to enter one-half inch without turning nut; 1 injured.

*January 1, 1919, locomotive 3451, Royalton, Pa. Locomotive parted from train, due to knuckle lock on engine breaking, causing injury to conductor which resulted in death seven days later; old flaw in lock; 1 injured.

*January 3, 1919, locomotive 611, Duquesne, Pa. Piston key came out of left crosshead, knocking out cylinder head; 1 injured.

January 7, 1919, locomotive 1024, near Oaks, Pa. Crown sheet failure; low water; excessive accumulation of scale on crown sheet and base of crown bolts; crown bolts excessively calked; 2 injured.

January 13, 1919, locomotive 2138, Allegheny, Pa. Flue broke at weld, due to deterioration; defective weld; 1 injured.

January 14, 1919, locomotive 3232, East Corry, Pa. Blower valve handle disconnected, rendering blower inoperative, causing back draft; 2 injured.

January 15, 1919, locomotive 2616, Allegheny, Pa. Injector steam pipe valve blew out of fountain; defective threads in fountain, and valve had been screwed into fountain only $\frac{3}{8}$ inch; 2 injured.

January 16, 1919, locomotive 646, near Tyrone, Pa. Lubricator oil supply pipe to air pump broke off at lubricator connection, spraying engineer and fireman with oil, which ignited, setting fire to their clothes; old fracture in pipe; 2 injured.

**January 29, 1919, locomotive 303, Gallitzin, Pa. Flue broke, due to thinning of material, caused by corrosion; 1 injured.

*January 30, 1919, locomotive 3236, Columbia, Pa. Eccentric rod broke; 1 injured.

*February 1, 1919, locomotive 2206, Hazel Kirk, Pa. Injector ram blew out; 1 injured.

February 14, 1919, locomotive 2759, near Altoona, Pa. Gasket blew out of "Water-level indicator," which had been applied to locomotive for testing purposes; 1 injured.

*March 3, 1919, locomotive 3146, Mifflin, Pa. Cylinder head blew out; 1 injured.

*March 8, 1919, locomotive 425, Middletown, Del. Scalded by hot water from loose union of injector overflow pipe; 1 injured.

*March 14, 1919, locomotive 5120, West Philadelphia, Pa. Nuts worked off of stud in right valve stem crosshead guide stand, breaking eccentric rod; 1 injured.

*March 18, 1919, locomotive 191, Jersey City, N. J. Low step on engine caught on guard log on trestle; 1 injured.

April 14, 1919, locomotive 2512, near New Brunswick, N. J. Engineer fell from locomotive while attempting to operate injector; injector inoperative, due to accumulation of coal, gravel, and cinders in feed-water tank; right section of bulk head screen in feed-water tank disconnected; tank valve strainer defective; union in feed pipe leaking; 1 injured.

April 18, 1919, locomotive 1469, Philadelphia, Pa. Water glass gasket blew out; 1 injured.

April 18, 1919, locomotive 2796, Elmira, N. Y. Washout cap blew out while attempting to tighten under pressure; flaw in washout cap; 1 injured.

*April 24, 1919, locomotive 1517, Hillside, Pa. Main crank pin collar broke and flew off while engine was in motion, striking employee; 1 injured.

April 25, 1919, locomotive 5344, Manhattan Transfer, N. J. Arch-tube plug blew out of throat sheet; defective threads in sheet; 2 injured.

May 3, 1919, locomotive 2366, Waverly, N. J. Nozzle of fire hose blew off, due to being insecurely clamped; 1 injured.

May 19, 1919, locomotive 2363, Huff, Pa. Cylinder head knocked out, due to over travel, caused by liner being placed ahead of main brass, lengthening main rod; 1 injured.

June 6, 1919, locomotive 3536, Lawrence, N. J. Apron hinge disconnected, allowing apron to drop, permitting fireman to fall between engine and tender; right side of apron had been fastened by inserting wire in hinge bolt hole; 1 injured.

Thirty-seven accidents; 1 killed, 48 injured.

PERE MARQUETTE RAILROAD:

September 9, 1918, locomotive 383, Smyrna, Mich. Locomotive and tender derailed; front tender truck bolster female center worn thin, and in a defective condition, allowing side bearing to ride solid; feed-water tank not equipped with longitudinal splash plates; 1 killed, 1 injured.

*June 3, 1919, locomotive 185, Peacock, Mich. Squirt hose blew off; 1 injured.

Two accidents; 1 killed, 2 injured.

PHILADELPHIA & READING RAILROAD:

October 1, 1918, locomotive 1520, Lebanon, Pa. Crown sheet failure; low water; no contributory causes found; 2 killed, 3 injured.

October 4, 1918, locomotive 1330, Coatesville, Pa. Injector steam pipe spanner nut blew off; threads on nut partially stripped, and nut stretched, due to use of hammer and set in tightening; 1 injured.

*June 2, 1919, locomotive 1568, Tamaqua, Pa. Handhold on front of locomotive broke; old flaw in material; 1 injured.

*June 20, 1919, locomotive 1555, Pencoyd, Pa. Handhold on locomotive broke, due to old flaw in material; 1 injured.

Four accidents; 2 killed, 6 injured.

PITTSBURGH, SHAWMUT & NORTHERN RAILROAD:

*September 9, 1918, locomotive 66, Bolivar, N. Y. Relief valve cap on locomotive blew off; 1 injured.

One accident; 1 injured.

RUTLAND RAILROAD:

February 11, 1919, locomotive 450, Burlington, Vt. Right No. 1 driving spring hanger broke, permitting engine to drop sufficiently to allow footboards to catch and bend under front of locomotive; old defect entire width of hanger; 1 killed.

One accident; 1 killed.

ST. LOUIS-SAN FRANCISCO RAILROAD:

**July 15, 1918, locomotive 140, Wichita, Kans. Washout plug blew out; attempted to tighten under pressure; 1 injured.

August 18, 1918, locomotive 1281, Baxter, Kans. Water glass burst; cut by flying glass; shield removed at time of accident; 1 injured.

September 5, 1918, locomotive 2686, Winona, Mo. Train line air pipe to air gauge broke, causing brakes to apply, crushing employe's arm between cam type brake lever and ash pan blower pipe; 1 injured.

November 14, 1918, locomotive 1018, (U. S. A.), near Plantersville, Miss. Crown sheet failure; low water; no contributory causes found; 1 killed, 2 injured.

November 22, 1918, locomotive 1213, Henryetta, Okla. Injector steam pipe blew out at collar connection to injector, due to defective and improper brazing; 1 injured.

January 3, 1919, locomotive 225, Ft. Scott, Kans. Crown sheet failure; low water; no contributory causes found; 2 killed.

January 25, 1919, locomotive 962, near Hickory Flat, Miss. Crown sheet failure; low water; operating without water glass; 1 killed, 1 injured.

January 27, 1919, locomotive 640, near Arma, Kans. Flue broke at weld; overheated in welding; 1 injured.

January 31, 1919, locomotive 782, near Sooner, Okla. Flue broke at weld; overheated in welding; 1 injured.

February 27, 1919, locomotive 988, West Tulsa, Okla. Water glass cock blew out, due to being screwed out too far; valve of poor design; 1 injured.

*March 7, 1919, locomotive 827, Tulsa, Okla. Pin holding shaker bar broke; 1 injured.

**March 29, 1919, locomotive 1284, Hillsdale, Kans. Grate connection broke; 1 injured.

March 30, 1919, locomotive 8, Sterling, Mo. Crown sheet failure; low water; no contributory causes found; 2 injured.

*April 2, 1919, locomotive 15, Keyes Summit, Mo. Handhold on engine broke, permitting engineer to fall; 1 injured.

*May 8, 1919, locomotive 724, Nettleton, Ark. Squirt hose pipe burst; 1 injured.

June 17, 1919, locomotive 3742, St. Louis, Mo. Water glass burst; cut by flying glass; inefficient shield; 1 injured.

Sixteen accidents; 4 killed, 17 injured

SEABOARD AIR LINE RAILROAD:

September 14, 1918, locomotive 494, Henderson, N. C. Crown sheet failure; low water; gauge cock drip stopped up; 2 injured.

October 11, 1918, locomotive 786, near Lees Station, Fla. Injector steam pipe collar broke; old fracture in collar; 1 injured.

November 15, 1918, locomotive 1554, Jacksonville, Fla. Crown sheet failure; low water; steam gauge siphon partially stopped up; opening in bottom water glass cock and hole in sheet almost closed by scale formation; left tank valve inoperative; both tank hose strainers partially stopped up; 1 injured.

January 20, 1919, locomotive 408, Bellwood, Va. Crown sheet failure; low water; gauge cocks leaking; gauge cock drip stopped up; right tank hose leaking at feed pipe connection; 2 injured.

*February 1, 1919, locomotive 307, Howells, Ga. Injured due to defective squirt hose; 1 injured.

April 1, 1919, locomotive 174, near Glencoe, Ga. Crown sheet failure; low water; operating without water glass, due to top water glass cock packing nut leaking so badly that water glass cocks had to be closed leaving terminal; 1 injured.

April 16, 1919, locomotive 307, Roper, Ala. Washout plug blew out; attempted to tighten under pressure; plug insecurely applied; 1 injured.

May 13, 1919, locomotive 511, Method, N. C. Crown sheet failure; low water; loose nozzle in right injector; 3 killed.

*May 20, 1919, locomotive 404, Cochran, Va. Shaker bar slipped off lever; bar too large for shaker lever; 1 injured.

Nine accidents; 3 killed, 10 injured.

SOUTHERN PACIFIC—ATLANTIC SYSTEM:

September 12 ,1918, locomotive 95, Englewood, Tex. Injured while operating reverse lever; boiler foaming, washing oil off of valves, causing lever to operate hard; throttle leaking; 1 injured.

*November 7, 1918, locomotive 704, Stafford, Tex. Eccentric strap on locomotive broke; old flaw in strap; 1 injured.

November 23, 1918, locomotive 91, Glidden, Tex. Blow-off pipe blew out at T connection; threads on pipe and T badly worn; 1 injured.

November 28, 1918, locomotive 786, near Emerson, Tex. Flue broke at weld; overheated in welding; 1 injured.

November 28, 1918, locomotive 816, near Uvalde, Tex. Flue broke at weld; overheated in welding; 1 injured.

March 30, 1919, locomotive 210, Groose Tete, La. Shaker bar slipped off lever; 1 injured.

June 21, 1919, locomotive 813, San Antonio, Tex. Injector primer valve and bonnet blew out; threads in body of injector badly worn; 1 injured.

**June 27, 1919, locomotive 49, Jacksonville, Tex. Reverse lever slipped out of quadrant, due to nut on reverse lever latch working loose; 1 injured.

Eight accidents; 8 injured.

SOUTHERN PACIFIC—PACIFIC SYSTEM:

August 9, 1918, locomotive 2438, near Lakeside, Utah. Left injector steam pipe sleeve broke, due to improper application; 1 injured.

*October 6, 1918, locomotive 2599, Ogilby, Calif. Main rod on locomotive broke, due to old fracture; 1 injured.

*October 18, 1918, locomotive 2705, Benson, Ariz. Squirt hose became disconnected; 1 injured.

*December 13, 1918, locomotive 1089, Fresno, Calif. Acetylene headlight on locomotive exploded; 1 injured.

January 18, 1919, locomotive 2415, Pomar, Calif. Injector steam pipe broke at throttle connection; old break in brazing; 2 injured.

*January 22, 1919, locomotive 2327, Ripon, Calif. Crank pin broke; 2 injured.

January 26, 1919, locomotive 1096, Port Costa, Calif. Boiler check stuck open; while attempting to seat check, cap blew out; cap too small for opening in check casing; 1 injured.

April 26, 1919, locomotive 2746, Niland, Calif. Overflow valve bonnet blew out while attempting to inject bran into boiler to stop leaks in firebox; 1 injured.

**June 6, 1919, locomotive 2645, Edna, Calif. Scalded while filling lubricator, due to coupling nut in lubricator drain pipe being loose; 1 injured.

June 11, 1919, locomotive 2169, Los Angeles, Calif. Fusible plug blew out of crown sheet; plug insecurely applied; 1 injured.

Ten accidents; 12 injured.

SOUTHERN RAILROAD:

July 17, 1918, locomotive 1678, Pinners Point, Va. Squirt hose blew off; hose insecurely clamped; 1 injured.

August 6, 1918, locomotive 6229, Lumberton, Miss. Reverse lever latch slipped out of quadrant; insufficient clearance between reverse lever and boiler head; 1 injured.

September 17, 1918, locomotive 809, Inman Yards, Ga. Washout plug blew out of back head; defective threads in sheet and attempted to tighten under pressure; 1 injured.

September 18, 1918, locomotive 328, Birmont, Ga. Reverse lever bracket stud blew out; 1 injured.

October 18, 1918, locomotive 4602, near Riverside, Ala. Cab bracket stud blew out; 2 injured.

October 21, 1918, locomotive 6356, Sterns, Ky. Shaker bar slipped off lever, due to improper design; 1 injured.

October 24, 1918, locomotive 445, near Pomaria, S. C. Flue broke at weld; overheated in welding; 1 injured.

November 1, 1918, locomotive 1347, Oxama, Ala. Shaker bar slipped off lever; shaker bar too large for lever; 1 injured.

November 4, 1918, locomotive 6018, Citico, Tenn. Shaker bar slipped off post, due to improper fit; 1 injured.

November 6, 1918, locomotive 690, near Evans, S. C. Crown sheet failure; low water; no contributory causes found; 4 injured.

November 12, 1918, locomotive 4618, near Lincoln, Ala. Shaker bar slipped off lever; 1 injured.

November 19, 1918, locomotive 6207, Williamstown, Ky. Shaker bar slipped off lever; shaker bar and lever of improper design; excessive taper at shaker bar connection to lever; 1 injured.

November 28, 1918, locomotive 6593, Cuba, Ala. Injured while operating reverse lever; insufficient clearance between lever and automatic and independent brake valve and pipes; 1 injured.

December 2, 1918, locomotive 293, Atlanta, Ga. Throttle flew open, due to weak spring and worn quadrant on throttle lever; 1 injured.

December 5, 1918, locomotive 668, Waddy, Ky. Injured while operating reverse lever; lever difficult to operate, due to lack of lubrication; no extra supply of valve oil on locomotive; 1 injured.

December 13, 1918, locomotive 883, Nickerjack, Ga. Steam pipe in front end broke at weld; pipe had cracked, due to defect in casting, and had been repaired by autogenous welding; pipe burst first trip after being put into service; 1 injured.

December 26, 1918, locomotive 4599, Atlanta, Ga. Injured while operating reverse lever; insufficient clearance between lever and cab; 1 injured.

January 16, 1919, locomotive 4610, Parrish, Ala. Ashpan blower pipe broke off at nozzle, due to pipe being badly deteriorated; 1 injured.

January 26, 1919, locomotive 6607, Woodlawn Junction, Ala. Shaker bar slipped off staff; 1 injured.

March 8, 1919, locomotive 801, Ellenwood, Ga. Ashpan blower pipe pulled out at ashpan casting connection, due to defective threads and improper fit; pipe insecurely clamped; 1 killed.

March 12, 1919, locomotive 358, Statesville, N. C. Tank hose blew off; hose stopped up with coal and dirt, and not securely clamped; 1 injured.

March 13, 1919, locomotive 1896, (U. S.), Meridian, Miss. Shaker bar slipped off lever; 1 injured.

March 20, 1919, locomotive 6261, Lexington, Ky. Burned while attempting to remove cap from grease cup on side rod; pin running hot, due to bushing keeper missing; 1 injured.

March 22, 1919, locomotive 6263, McCalla, Ala. Throttle difficult to operate, due to being improperly balanced; 1 injured.

March 29, 1919, locomotive 323, Sheperdson, N. C. Squirt hose blew off; hose insecurely clamped; 1 injured.

May 2, 1919, locomotive 6605, Attalla, Ala. Left main crank pin broke; old fracture in pin; 1 injured

*May 23, 1919, locomotive 1261, Macon, Ga. Injured due to grab iron on tank breaking; 1 injured.

May 29, 1919, locomotive 1237, Monroe, Va. Squirt hose parted at splice, due to being insecurely clamped; 1 injured.

June 4, 1919, locomotive 1309, near Lovick, Ala. Cab apron worn and defective; 1 injured.

June 7, 1919, locomotive 5209, Lynchburg, Va. Hose applied to injector delivery pipe for washing out ashpan, blew off; hose insecurely clamped; 1 injured.

June 15, 1919, locomotive 4502, near Glass, N. C. Crown sheet failure; low water; no contributory causes found; 1 injured.

June 15, 1919, locomotive 4528, Choccolocco, Ala. Burned by hot grease from grease cup on main pin; pin running hot, due to hole in rod stopped up; 1 injured.

June 16, 1919, locomotive 4618, Douglasville, Ga. Rib fractured while operating reverse lever, due to counterbalance spring being out of adjustment; 1 injured.

June 24, 1919, locomotive 1646, Atlanta, Ga. Loose step on engine, causing engineer to fall; 1 injured.

*June 25, 1919, locomotive 716, Lucama, N. C. Running gear on engine stripped; 2 injured.

June 30, 1919, locomotive 623, Woodville, Ala. Back end of right main rod broke, due to liners coming out of front end; 1 injured.

Thirty-six accidents; 1 killed, 40 injured.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS:

October 1, 1918, locomotive 65, St. Louis, Mo. Water glass burst; cut by flying glass; 1 injured.

One accident; 1 injured.

TEXAS & PACIFIC RAILROAD:

October 29, 1918, locomotive 510, Longview, Tex. Washout plug blew out; attempted to tighten under pressure; defective threads in sheet; 1 injured.

November 2, 1918, locomotive 294, Sellers, La. Crown sheet failure; low water; left tank hose strainer missing; deposit of coal at lower end of left tank hose; 1 killed, 5 injured.

November 22, 1918, locomotive 319, Ft. Worth, Tex. Crown sheet failure; low water; guage cock drip stopped up; right feed pipe strainer missing; six staybolts broken; crown sheet and firebox side sheets pitted; 3 injured.

January 18, 1919, locomotive 206, Webbers Spur, La. Injured while operating reverse lever; insufficient clearance between lever and boiler head; 1 injured.

February 7, 1919, locomotive 207, Rapides, La. Ashpan dropped down from locomotive, due to failure of studs; threads in stud holes in mud ring badly corroded and worn; one stud broken, and two with threads worn and corroded away; 1 injured.

February 18, 1919, locomotive 451, Ft. Worth, Tex. Explosion of fuel oil tank, due to accumulation of gas; steam oil heater valve seat badly cut and leaking; 1 injured.

March 1, 1919, locomotive 687, (M. K. & T.), Ft. Worth, Tex. Headlight turbine broke, due to excessive speed; governor center piece worn one-eighth inch, and graphite ring worn one-sixteenth inch; 2 injured.

*March 3, 1919, locomotive 268, Egard, La. Shaker bar became disconnected, due to bolt working out; 1 injured.

Eight accidents 1 killed, 15 injured.

TOLEDO & OHIO CENTRAL RAILROAD:

September 9, 1918, locomotive 5640, (N. Y. C.), Junction City, Ohio. Squirt hose blew off; hose insecurely clamped; 1 injured.

September 17, 1918, locomotive 9574, Corning, Ohio. Squirt hose parted at splice; 1 injured.

February 19, 1919, locomotive 9557, West Columbus, Ohio. Three-inch sunflower plug applied in abandoned arch tube hole in flue sheet blew out while being calked under pressure; staybolt securing plug to outer sheet broken and telltale hole plugged; plug had been heavily calked around at previous times; 1 killed.

Three accidents; 1 killed, 2 injured.

TOLEDO, ST. LOUIS & WESTERN RAILROAD:

**February 27, 1919, locomotive 165, Stewardson, Ill. Scalded by hot water from squirt hose, due to boiler check leaking, which defect had been reported on several occasions previous to accident; 1 injured.

One accident; 1 injured.

TRINITY & BRAZOS VALLEY RAILROAD:

June 28, 1919, locomotive 28, Keisler Spur, Tex. Blow-off discharge pipe, operated from running board, blew out of elbow; threads on pipe badly worn; 1 injured.

One accident; 1 injured.

UNION PACIFIC RAILROAD:

July 23, 1918, locomotive 1914, Cheyenne, Wyo. Blow-off cock discharge pipe blew out; pipe screwed into blow-off cock only four threads; blow-off cock leaking; 1 injured.

November 20, 1918, locomotive 1941, Ridge, Wyo. Portion of steam pipe, 14½ inches long by 4½ inches wide, blew out; old crack 4 inches long in pipe, which had been repaired by autogenous welding; 2 injured.

December 7, 1918, locomotive 2890, Central City, Nebr. Flue broke at weld; defective weld; 1 injured.

January 27, 1919, locomotive 1929, near Egbert, Wyo. Flue broke at weld, due to thinning of material, and old fracture one-fourth the circumference of flue; 1 injured.

March 8, 1919, locomotive 2869, near Green River, Wyo. Broken staybolt blew out of right firebox side sheet; threads on bolt and in sheet practically wasted away, due to leakage and corrosion; 1 injured.

June 8, 1919, locomotive 2843, near Fremont, Nebr. Sleeve of left injector steam pipe broke off at fountain connection; 1 injured

June 25, 1919, locomotive 279, near Schuyler, Nebr. Crown sheet failure; low water; no contributory causes found; 2 injured.

Seven accidents; 9 injured.

VIRGINIAN RAILROAD:

December 20, 1918, locomotive 463, Kinney, Va. Locomotive and tender separated from train; low coupler on tender; broken springs and bent draft key; 2 injured.

February 5, 1919, locomotive 105, Cullin, Va. Right front driving wheel tire slipped off wheel center, causing derailment of locomotive and two cars; due to loose fit of tire, and driver brakes leaking on; 2 injured.

*March 20, 1919, locomotive 102, Abilene, Va. Piece flew off of driver brake shoe, striking fireman; 1 injured.

*April 29, 1919, locomotive 801, Princeton, W. Va. Squirt hose blew off; 1 injured.

Four accidents; 6 injured.

WABASH RAILROAD:

July 22, 1918, locomotive 2408, Camden Junction, Mo. Engine truck derailed; right engine truck radius bar 1½ inches short, causing right wheel to crowd rail; sharp flange on right engine truck wheel; 1 injured.

September 21, 1918, locomotive 531, Kansas City, Mo. Squirt hose blew off; hose not clamped; 1 injured.

December 5, 1918, locomotive 715, Darlington, Mo. Bushing of squirt pipe broke, due to old fracture two-thirds the circumference of bushing; 1 injured.

January 20, 1919, locomotive 2032, Brunswick, Mo. Curtain pole broke, causing fireman to fall; 1 injured.

February 12, 1919, locomotive 1501, Kansas City, Mo. Gas hose of acetylene headlight leaking and ignited while attempting to light headlight; 1 injured.

*March 2, 1919, locomotive 215, Moberly, Mo. Water glass burst; cut by flying glass; 1 injured.

*March 23, 1919, locomotive 669, Decatur, Ill. Water glass burst; cut by flying glass; 1 injured.

*April 22, 1919, locomotive 2043, Mitchell, Ill. Driving tire came off; 1 injured.

*June 30, 1919, locomotive 2002, Anglum, Mo. Injured while using defective squirt hose; 1 injured.

Nine accidents; 9 injured.

WESTERN MARYLAND RAILROAD:

October 20, 1918, locomotive 151, Maryland Junction, W. Va. Arch tube washout plug blew out; plug cross-threaded; attempted to tighten under pressure; 1 injured.

One accident; 1 injured.

WESTERN PACIFIC RAILROAD:

January 26, 1919, locomotive 204, near Clio, Calif. Crown sheet failure; low water; bottom cock of left water glass partially stopped up; left injector would not supply boiler, due to stem of inlet valve broken; 1 killed, 2 injured.

One accident; 1 killed, 2 injured.

YAZOO & MISSISSIPPI VALLEY RAILROAD:

April 17, 1919, locomotive 558, (I. C.), Gwinn, Miss. Grate bearer stud blew out; defective threads on stud and in sheet; 1 injured.

One accident; 1 injured.