INTERSTATE COMMERCE COMMISSION

FORTY-THIRD ANNUAL REPORT

OF THE

DIRECTOR OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

FISCAL YEAR ENDED JUNE 30, 1954



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1954

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 20 cents

ANNUAL REPORT OF THE DIRECTOR OF LOCOMOTIVE INSPECTION

September 30, 1954.

To the Interstate Commerce Commission:

In compliance with section 7 of the act of February 17, 1911, as amended, the Forty-third Annual Report of the Director of Locomotive Inspection, covering the work of the fiscal year ended June 30, 1954, is respectfully submitted.

Summaries are given, by railroads, of all accidents which resulted in serious injury or death to one or more persons, due to the failure of parts and appurtenances of locomotives, as reported and investigated under section 8 of the Locomotive Inspection Act. Accidents which occurred as a result of failure of parts and appurtenances of locomotives, which resulted in damage to property or equipment but not serious injury or death, are not included in this report. For additional information concerning railroad accidents, see Accident Bulletin, prepared by the Bureau of Transport Economics and Statistics.

The tables showing the number of accidents, the number of persons killed, and the number of persons injured have been arranged to permit comparison with previous years as far as consistent. Tables are also given showing the number of locomotives inspected, the number and percentage of those inspected found defective, the number for which written notices for repairs were issued in accordance with section 6 of the law, and the total number of defects found and reported. The data contained therein cover all defects on all parts and appurtenances of locomotives found and reported by our inspectors, arranged by railroads.

Summaries and tables show separately accidents and other data in connection with steam locomotives and tenders and their appurtenances and accidents and other data in connection with locomotive units other than steam.

Table I.—Reports and inspections—Steam locomotives

	Year ended June 30—									
	1954	1953	1952	1951	1950	1949				
Number of locomotives for which reports were filed. Number inspected. Number found defective Percentage of inspected found defective Number ordered out of service Number of defects found	12, 135 19, 999 2, 599 13. 0 117 9, 763	15, 798 28, 899 3, 583 12. 4 163 12, 980	20, 490 45, 220 6, 234 13. 8 370 24, 738	26, 595 62, 113 7, 995 12. 9 508 34, 657	29, 743 66, 809 6, 740 10, 1 399 28, 504	33, 866 85, 353 7, 035 8. 2 436 28, 642				

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Table II.—Accidents and casualties caused by failure of some part of the steam locomotive, including boiler, or tender

	Year ended June 30—									
	1954	1953	1952	1951	1950	1949				
Number of accidents Percent increase or decrease from previous year. Number of persons killed. Percent increase or decrease from previous year. Number of persons injured. Percent increase or decrease from previous year.	32 45. 8 1 91. 7 39 37. 1	59 51, 6 12 1300, 0 62 50, 8	122 26. 9 3 78. 6 126 25. 9	167 1, 2 14 1100. 0 170 7, 6	169 25. 9 7 30. 0 184 24. 3	228 33. 1 10 33. 3 243 32. 7				

¹ Increase.

Table III.—Accidents and casualties caused by failure of some part or appurtenance of the steam locomotive boiler ¹

			Ye	ar ended	June 30-	-		
	1954	1953	1952	1951	1950	1949	1915	1912
mber of accidents	19 1 26	18 10 19	35 2 36	51 3 59	59 4 70	81 9 94	424 13 467	856 91 1,005

¹ The original act applied only to the locomotive boiler.

Table IV.—Number of casualties classified according to occupation—Steam locomotive accidents

				Year	r ended	June :	30—			
	1954		1953		1952		1951		19	50
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews: Engineers. Firemen. Brakemen. Conductors. Switchmen. Roundhouse and shop employees: Boilermakers. Machinists. Foremen. Inspectors. Watchmen. Boiler washers.		2	4 4 3	23 21 8 3 2	1 2	36 45 19 3 2 2 2 2	2 3 1 1 1	51 62 20 6 8	2 2 2 2	64 64 29 4 5 1 1 1 2 4
Other roundhouse and shop employees.				2		8 2	1	2 3		1 2
Other employees			1	1		$\frac{1}{2}$	4	6		1
Total	1	39	12	62	3	126	14	170	7	184

DIRECTOR OF LOCOMOTIVE INSPECTION

Table V.—Reports and inspections—Locomotive units other than steam

	Year ended June 30—								
	1954	1953	1952	1951	1950	1949			
Number of locomotive units for which reports were filed Number inspected Number found defective Percentage of inspected found defective Number ordered out of service Number of defects found	27, 135 83, 338 7, 395 8. 9 140 19, 640	25, 374 75, 170 6, 571 8. 7 118 17, 163	22, 716 65, 263 6, 087 9. 3 135 16, 613	19, 320 52, 948 4, 375 8. 3 106 11, 935	15, 719 42, 503 2, 748 6. 5 42 6, 325	12, 692 30, 684 1, 238 4, 0 20 2, 804			

Table VI.—Accidents and casualties caused by failure cf some part or appurtenance of locomotive units other than steam

	Year ended June 30—									
	1954	1953	1952	1951	1950	1949				
Number of accidents Number of persons killed Number of persons injured	73 2 263	75 88	74 1 77	54 2 129	51 3 50	4 9				

 ${\it Table~VII.-Number~of~casualties~classified~according~to~occupation--Locomotive~units~other~than~steam } \\$

	Year ended June 30—										
	1954		1953		1952		19	1951		50	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	
Members of train crews: Engineers. Firemen Brakemen Conductors Switchmen Maintenance employees Other employees Nonemployees	2	24 29 7 2 3 8 2 188		14 36 12 5 2 4 2	1	15 31 12 4 8 6	1	11 30 4 5 3 13 63	1 2	15 21 3 4 1 3 2 1	
Total	2	263		88	1	77	2	129	3	50	

Table VIII.—Accidents and casualties resulting from failures of steam locomotives and tenders and their appurtenances

ana t	iena	ers	ana	ine	ir a	ppu	irten	anc	es						
				-		Yea	r en	ded	June	30-	-				
Part or appurtenance which caused		1954			1953	3		1952	2		1951	l		1950)
accident	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs Aprons Arch tubes Ashpan blowers							1		1	1 1		1 1	2		2
Axles				1		1	1		_i -						
Blow-off cocks Boiler checks Boiler explosions: A. Shell explosions	1		1				3		3	3		3	3		3
B. Crown sheet; low water; no contributory causes found C. Crown sheet; low water; con-				3	10		3	1	5	5	3	8	8	4	12
tributory causes or defects found	1	1	7	1		2	1		1	1		5	1		2
Brakes and brake rigging				2 2		2 2	2		2	3 2	3	3 2	2	1	2
Couplers Crank pins, collars, etc Crossheads and guides				2	2	4	1		 1	2	ī	1	1 1		1 2
ylinder cocks and rigging ylinder heads and steam chests				1		1									
Dome caps Draft appliances	1		1												;
Oraw gear Fire doors, levers, etc.	1		1	2		2 6	3		4	1 2 3		$\begin{vmatrix} 1\\2\\3 \end{vmatrix}$	$\begin{bmatrix} 1\\2\\6 \end{bmatrix}$		1 2 9
lue pockets. Footboards Page cocks	1		<u>i</u> -	2		2	9		9	8		8-			8
rease cups			 							<u>-</u> -			1		i
Frate shakers Tandholds Teadlights and brackets	2		2	4		4	3 8 1		8 1	7 14 1	1	14	11 1		6 11 1
njectors and connections (not in- cluding injector steam pipes) njector steam pipes	4		4	3		3	9	1	8	3		3	7		7
Jubricators and connections	Ī		1				1		1	4		4	2		2 1
Patch bolts Pistons and piston rods Plugs, arch tube and washout										2		2	1		
Plugs in firebox sheets. Reversing gear Livets. Lods, main and side. Lafety valves.				1		1	5		7	5		5	9	1	8
Rivets							3	1	3				₁ -		2
anders							3		3	1		1	4		4
anders. ide bearings. prings and spring rigging quirt hose.	2		2				1 4		1 4	6		6	3 9		3 9
tay boits			3 2	2 2		2 2	1 2		1 2	2 3 3		6 2 3 3	1 3 3		3 9 1 6 3 1 3 2 2
team valves tuds uperheater tubes Prottle glands	1		1	- 						_i -		1	1 3 2		3 3
Phrottle rigging				1		1	15		1 	5 5		5 5	2 7		2 7
rucks, leading, trailing, or tender Alve gear, eccentrics, and rods				1		₁ -	1 2		12	5 2 2 1		5 2 2 1	3		
Vater glasses Vater-glass fittings Vheels	1		<u>i</u> -	$\frac{2}{1}$		2				1		1			
Aiscellaneous	8		8	23		23	45		45	61 167	6	59	46		49
Total	32	1	39	59	12	62	122	3	126	107	14	170	169	7	184

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<i>7</i> €67	243	OCOMOTIVE S-	IOWING AND CASUALTIES RESULTING FROM LOCOMOTIVE FAILURES.
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SC	\$ \\ \frac{2}{5} \\ \	ILLUSTRATING FAILURES OF FOORWITHE BOILERS AND THEIR APPURIE	RE
1 300	8 8	12 12 12 12 12 12 12 12 12 12 12 12 12 1	

*360 550 250 0,50 RESULTING 5 556 30™ JUNE 934 933 ENDED DEFECTIVE P

						Yea	r ene	ded J	une :	30					
Part or appurtenance which	1954			1953		1952			1951			1950			
caused accident	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Brakes and brake rigging	1		1 	3 - 2		3	5		6	2 1		3 	1		1
of fuel, crankcase explosions, back firing, etc	5 3 3		7 3 3	13 1		24 1 	7		8	9 2 1 1	  1	10 2 1	4 1	  1	1
Short circuits	5 56	2	6 243	9 46		9 47	9 51	<u>i</u> -	11 50	9 29	1	103	38	2	38
Total	73	2	263	75		88	74	1	77	54	2	129	51	3	50

Table X.—Number of steam locomotives reported, inspected, found defective, and ordered out of service

Pa	rts defective, inoperative or missing, or in viola-		Ye	ar ended	June 30		
	tion of the rules	1954	1953	1952	1951	1950	1949
1	Air compressors	304	351	671	897	719	$\epsilon$
	Arch tubes	4	5	12	17	9	
	Ashpans and mechanism	$2\overline{4}$	36	59	64	59	
i I	Axles	3		1	4	1	
	Blow-off cocks	121	185	299	262	220	
í	Boiler checks	158	182	356	477	386	
;	Boiler shell	79	94	174	226	211	
3	Brake equipment	835	1.038	1, 955	2, 453	1,845	1,
	Cabs, cab windows, and curtains	298	354	694	1, 173	862	
<i>i</i>	Cab aprons and decks	133	179	295	395	364	
	Cab cards	27	40	53	83	97	
	Coupling and uncoupling devices	22	30	42	54	41	
	Crossheads, guides, pistons, and piston rods.	398	478	1,035	1, 363	1, 100	1.
		20	27	38	52	53	,
1	Cylinders, saddles, and steam chests.	364	455	908	1, 437	1, 160	1,
		132	136	328	474	376	-,
3	Cylinder cocks and rigging	20	45	85	131	90	
	Domes and dome caps	150	168	313	441	368	
	Draft gear	79	108	189	297	280	
!	Draw gear	19	108	139	251	200	
)	Driving boxes, shoes, wedges, pedestals, and	050	045	601	1 145	1,037	1.
. 1	braces.	258	345	$\frac{681}{141}$	1, 145 203	181	1,
1	Firebox shcets	37	55 49	121	184	152	
2	Flues	32		368	486	451	
3	Frames, tail pieces, and braces, locomotive	151	225			34	
Ł	Frames, tender	14	10	26	47	116	
5	Gages and gage fittings, air.	47	61	136	173	272	
3	Gages and gage fittings, steam	89	112	228	325	386	
7	Gage cocks	120	211	337	495	326	
3	Grate shakers and fire doors	90	121	282	339		
9	Handholds	146	196	353	420	439	
)	Injectors, inoperative	33	18	34	60	45	1.
l	Injectors and connections.	674	843	1,615	2, 190	1, 767	1,
2	Inspections and tests not made as required	24	53	68	121	122	
3	Lateral motion	98	137	274	465	389	
1	Lights, eab and classification	39	26	44	118	60	
5	Lights, headlight	56	42	100	108	131	
3	Lubricators and shields	63	81	160	222	157	
7	Mud rings	65	78	149	153	145	
3	Packing nuts	240	294	552	638	558	
0	Packing, piston rod and valve stem	154	220	494	765	510	
0	Pilots and pilot beams.	52	48	102	124	126	
1	Plugs and studs	22	50	191	117	104	
2	Reversing gear.	170	216	429	631	404	
3	Rods, main and side, crankpins, and collars	315	459	990	1, 511	1, 213	1,
4	Safety valves	15	19	39	45	34	i
5	Sanders	277	324	552	806	641	
6	Springs, and spring rigging	834	1,322	2, 424	3, 340	2,848	3,
7	Squirt hose	39	41	_69	90	74	
8 I	Stay bolts	108	144	254	280	229	į.

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Table X.—Number of steam locomotives reported, inspected, found defective, and ordered out of service—Continued

Parts defective, inoperative or missing, or in viola-		Y	ear ende	d June 30	0—	
tion of the rules	1954	1953	1952	1951	1950	1949
49 Stay bolts, broken. 50 Steam pipes. 51 Steam valves. 52 Steps. 53 Tanks and tank valves. 54 Teltale holes. 55 Throttle and throttle rigging. 56 Trucks, engine and trailing. 57 Trucks, tender. 58 Valve motion. 59 Washout plugs. 60 Stokers. 61 Water glasses, fittings, and shields. 62 Wheels. 63 Miscellaucous—Signal appliances, badge plates, brakes (hand).  Number of defects.  Locomotives reported. Locomotives defective. Percentage of inspected found defective. Locomotives ordered out of service.	87 69 255 340 113 228 171 152 174 79 55 282 107 263 9, 763 12, 135 19, 999 2, 599 13, 0	125 161 68 321 466 6 6 327 263 219 195 138 133 357 151 339 12, 980 15, 798 28, 899 3, 583 12, 48	159 232 146 561 980 980 427 474 437 266 253 651 340 569 24, 738 20, 490 6, 234 13.8 370	282 342 181 805 1, 304 33 927 700 710 673 325 335 536 858 536 774 34, 657 26, 595 62, 113 7, 995 12, 9	193 302 131 680 1, 205 28 664 580 289 261 907 394 652 28, 504 29, 743 66, 809 6, 740 10.1 399	196 256 133 652 1, 228 33 7099 545 471 484 268 216 920 455 626 28, 642 33, 866 85, 363 7, 035 8, 2, 2 436

Table XI.—Number of locomotive units other than steam reported, inspected, found defective, and ordered from service

I	arts defective, inoperative or missing, or in viola-		Y	ear endec	l June 30	)—	
	tion of the rules	1954	1953	1952	1951	1950	1949
1	Air compressors	326	210	206	146	99	26
2	Axles, truck and driving	. 4	7	3	2	2	1
4 5	Batteries	82	40	39	85	20	13
6	Boilers Brake equipment	175	103	69	43	46	9
8	Cabs and cab windows	2, 126	1,698	1,450	1,166	673	299
9	Cab cards	858	679	813	672	377	159
10	Cab floors, aprons, and deck plates.	135	128	139	100	75	46
11	Clutches	1, 703 5	1,589	1, 694	1, 281	726	234
12	Controllers, relays, circuit breakers, magnet	3	9	5	4	1	2
	valves and switch groups	454	424	222	166	61	35
13	Coupling and uncoupling devices.	139	95	76	35	32	15
14	Current collecting apparatus	12	6	5	9	18	20
16	Draft gear	291	218	202	141	91	66
17 .	Draw gear	55	42	28	46	27	13
18	Driving boxes, shoes, and wedges	154	128	98	38		33
20	Frames or frame braces	32	22	33	27	9	5
22	Fucl system	1, 951	1,853	1,751	1,082	483	191
23	Gages or fittings, air	136	138	110	70	29	111
24	Gages or fittings, steam	56	44	11	14	14	2
25	Gears and pinions	12	13	26	9	15	6
26	Handholds	230	121	127	97	70	53
28 29	Inspections and tests not made as required	185	175	159	143	116	90
30	Insulation and safety devices	105	77	102	64	48	36
ου	Internal-combustion engine defects, parts and appurtenances	4 040	4 704				
32	Jack shafts	4,848	4, 564	4, 768	3, 270	1,456	602
33	Jumpers and cable connectors	170	7.50	101	100	8	11
35	Lateral motion, wheels		156	191	190 11	86	8
36	Lights, cab and classification	232	109	49	23	7	7 5
37	Lights, headight	28	42	22	16	ģ	3
39	Meters, volt and ampere	40	27	41	14	7	9
40	Motors and generators	813	655	674	314	106	46
42	Pilots and pilot beams	71	46	53	36	29	16
43	Plugs and studs		3	3	3		
44	Quills	11	6	15	26	10	9
46	Rods, main, side, and drive shafts			15	2	6	ľ
48	Sanders	1, 200 241	$\frac{1,224}{178}$	1,202	902	356	151
49 51	Springs and spring rigging, driving and truck	241	1/0	153	108	103	43
53	Stay bolts, broken or defective	154	119	89	•	_1	
54	Steps, footboards, et cetera	622	505	480	24	32	17
55	Switches, hand-operated, and fuses	34	17	18	377	284	213
56	Transformers, resistors, and rheostats.	6	3	2	15 9	9	1 9
57	Trucks	503	439	390	234	182	84
59 i	Water tanks	34 l	31	47	33	20	2

Table XI.—Number of locomotive units other than steam reported, inspected, found defective, and ordered from service—Continued

1:	Parts defective, inoperative or missing, or in viola-		Y	ear endec	l June 30	<del>-</del>	
•	tion of the rules	1954	1953	1952	1951	1950	1949
60 61 62 63	Water glasses, fittings, and shields	11 121 257 1,005	14 122 212 864	38 117 230 638	11 83 215 574	27 21 95 377	98 109
	Number of defects	19, 640	17, 163	16, 613	11, 935	6, 325	2,80
	Locomotive units reported Locomotive units inspected Locomotive units defective Percentage of inspected found defective Locomotive units ordered out of service		25, 374 75, 170 6, 571 8. 7 118	22, 716 65, 263 6, 087 9. 3 135	19, 320 52, 948 4, 375 8. 3 106	15, 719 42, 503 2, 748 6. 5 42	12, 693 30, 68- 1, 233 4. 6

## INVESTIGATION OF ACCIDENTS AND GENERAL CONDITION OF LOCOMOTIVES

All accidents reported as required by the law and rules were carefully investigated and appropriate action taken to prevent recurrence as far as possible. Copies of published reports of accident investigations were distributed to interested parties and otherwise used in our effort to bring about a diminution in the number of such accidents.

#### STEAM LOCOMOTIVES

Thirty-two accidents occurred in connection with steam locomotives resulting in 1 death and 39 injuries. This represents a decrease of 27 accidents; a decrease of 11 in the number of persons killed, and a decrease of 23 in the number of persons injured compared with the preceding year.

The chart on page 5 shows the relation between the percentage of defective steam locomotives and the number of accidents and casualties resulting from failures thereof, and illustrates the effect of operating locomotives in defective condition.

Table VIII shows the various parts and appurtenances of steam locomotives and tenders which through failure have caused serious and fatal accidents in the past 5 years. If the information contained in this table is taken advantage of and proper inspections and repairs made in accordance with the requirements of the law and rules many accidents will be avoided.

During the year 13 percent of the steam locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the locomotives were put into use; this is an increase of 0.6 percent from the results of the preceding year. One hundred and seventeen locomotives were ordered withheld from service by our inspectors because of the presence of defects that rendered the locomotives immediately unsafe; this is a decrease of 46 locomotives compared with the preceding year.

Detailed results of our inspections of steam locomotives of each railroad are shown in table XII.

## EXPLOSIONS AND OTHER BOILER ACCIDENTS

The single boiler explosion which occurred in the fiscal year was caused by overheating of the crown sheet due to low water. One person was killed and 7 were injured in this accident. There was a decrease of 3 boiler explosions as compared with the preceding year; a decrease of 9 fatalities and an increase of 5 in number of injuries from this cause as compared with the preceding year.

The locomotive involved in the explosion was engaged in terminal switching service and at the time of the accident was standing in a freight car yard. Examination of the boiler subsequent to the accident disclosed that the water level at time of the explosion as shown by sheet discoloration was approximately 6½ inches below the highest part of the crown sheet. It was also determined that gage cock nipples extended into the dripper thereby obstructing clear view of gage cock discharge.

A piece of the wall of the main steam pipe in the front end of a steam locomotive, approximately 6 x 16½ inches in size, broke out while the locomotive was hauling a freight train at an estimated speed of 35 miles per hour and resulted in serious injuries to 2 employees. The failure occurred in an area where the pipe wall was very thin, a fissure existed and the metal contained old fractures. The thin wall apparently was caused by a shifted core when the pipe was cast.

Another front-end accident occurred when the petticoat pipe in the smokebox of a steam locomotive became displaced; diverted the flow of exhaust steam and caused heavy back draft while the locomotive was hauling a freight train at an estimated speed of 35 miles per hour and caused serious injury to an employee. The bottom edge of the petticoat pipe had been attached to the top ring of the spark arrester by spot welds instead of bolts as specified by the manufacturer. Cinder cutting had caused detachment of some spot welds and heavy vibration had caused the remaining welds to fail.

Eighteen boiler and appurtenance accidents other than the explosion resulted in injuries to 19 persons. This represents an increase of 4 accidents and an increase of 2 in the number of persons injured in boiler accidents other than explosions as compared with the preceding year.

## EXTENSION OF TIME FOR REMOVAL OF FLUES

Four hundred and ninety-eight applications were filed for extension of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 28 of these cases the condition of the locomotives or other circumstances were such that extensions could not properly

be granted. Eleven extensions were granted after defects disclosed by our investigations were required to be repaired. Thirty-three applications were canceled for various reasons. Four hundred and twenty-six applications were granted for the full period requested.

## LOCOMOTIVE UNITS PROPELLED BY POWER OTHER THAN STEAM

Seventy-three accidents, resulting in 2 deaths and injuries to 263 persons occurred in connection with locomotive units propelled by power other than steam. This represents a decrease of 2 in the number of accidents, an increase of 2 in the number of persons killed and an increase of 175 in the number of persons injured compared with the preceding year.

During the year, 8.9 percent of the locomotive units inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the units were put into use; this represents an increase of 0.2 percent compared with the results obtained in the preceding year. One hundred and forty locomotive units were ordered withheld from service by our inspectors because of the presence of defects that rendered the units immediately unsafe; this represents an increase of 22 units compared with the preceding year. Locomotive units found defective were not ordered out of service if such defects did not render them unsafe for the service to which they were put.

The chart on page 6 shows the relation between percentage of defective locomotive units and the number of accidents and casualties resulting from failures thereof, and illustrates the effect of operating locomotives other than steam in defective condition.

Detailed results of our inspection of locomotive units other than steam are shown in Table XIII.

## ACCIDENTS INVOLVING OTHER THAN STEAM LOCOMOTIVE UNITS

In derailment of 2 locomotive units and 11 cars of a passenger train caused by a false flange on a slid flat driving wheel resulting from a seized traction motor pinion bearing on a Diesel-electric locomotive unit, 184 passengers, 4 mail clerks and 1 dining car employee were injured. Evidence developed during investigation of the accident indicated that the locked pair of wheels had been sliding for a distance of more than 24 miles prior to point where derailment occurred. No lubricant was found in the seized bearing which showed evidence of extreme overheating. The extent of damage to the bearing precluded determination of the cause of its failure. Because of the serious potentiality of accidents caused by sliding wheels it was recommended in a report prepared jointly with the Section of Railroad Safety that action be taken to provide that an indication of any slipping or sliding wheel on any Diesel-electric unit in the locomotive of a train will be shown in the control cab.

APPEALS

No formal appeal by any carrier was taken from the decisions of any inspector during the year.

#### ACKNOWLEDGMENT

Despite difficulties resulting from reduced personnel, inadequate operating funds, and resultant increase in workload, all members of this organization have assiduously discharged the duties of their respective positions and are commended for their cooperation and their interest in the advancement of locomotive safety.

JAMES E. FRIEND,

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Asst. Director of Locomotive Inspection.

## ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES AND TENDERS AND THEIR APPURTE-NANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1954, BY ROADS

[A double star (**) indicates accidents not properly reported, as required by rules 55 and 162. Complete investigations, therefore, could not be made, inasmuch as the Bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.

## ATCHISON, TOPEKA & SANTA FE RAILWAY:

July 2, 1953, locomotive 3766, Emporia, Kans. Cab window became disengaged from supporting brackets and fell to lowered position inside cab walls; inadequate provision for securing drop sash in the upper closed position and insufficient clearance between top rail of drop sash frame and top edge of inner cab wall; one injured.

One accident; one injured.

## ATLANTIC COAST LINE RAILROAD:

December 14, 1953, locomotive 2715, Waycross, Ga. Injector steam pipe collar in cab broke through 80 percent old fracture when set was used to tighten steam pipe spanner nut while under steam pressure; one injured.

One accident: one injured.

### BOSTON & MAINE RAILROAD:

May 16, 1954, locomotive 3630, Salem, Mass. Flue broke at front flue sheet; flue thinned due to erosion; one injured.

One accident; one injured.

## BROOKLYN EASTERN DISTRICT TERMINAL RAILROAD:

July 19, 1953, locomotive 14, Brooklyn, N. Y. Crown-sheet failure caused by overheating due to low water; gage cock nipples extended into dripper, obstructing clear view of gage cock discharge; one killed, seven injured.

One accident; one killed, seven injured.

## CHESAPEAKE & OHIO RAILWAY:

April 7, 1954, locomotive 1511, Raleigh, W. Va. Inspirator telltale pipe return bend was bent approximately 30 degrees out of center with drain pipe opening in the cab, permitting some of the discharge to strike reducer wall and top of drain pipe and be deflected into the cab; one injured.

One accident: one injured.

## CHICAGO, MILWAUKEE, St. PAUL & PACIFIC RAILROAD:

December 21, 1953, locomotive 382, near Chillicothe, Mo. Defective and improperly applied petticost pipe became displaced and closed exhaust opening to stack, resulting in back draft; one injured.

One accident; one injured.

## ILLINOIS CENTRAL RAILROAD:

July 3, 1953, locomotive 2607, near Manteno, Ill. Squirt hose valve opened; squirt hose valve, hose and storage tube were not the carrier's standard applica-

During the year, 11 persons were injured in falls caused by oil or rease accumulations on walking surfaces of Diesel-electric locomotive nits. Disability in these accidents amounted to 171 man-days. Oil leaks represented a large proportion of 1,703 defects reported by aspectors of locomotives under item of "cab floors, aprons and deck

lates." Action to avoid continuance of this type defect and accidents esulting therefrom is being stressed.

Incidence of cracked and broken wheels under Diesel-electric ocomotive units continues, but no accident was reported from this ause during the past year. Necessity for careful and frequent

aspection of Diesel unit wheels is well recognized, and apparently

he railroads are exercising diligence in the matter of wheel inspections. One person was killed when his clothing became entangled around a noving and unguarded fan shaft as he attempted to obtain a water ample from an inconvenienty located water glass drain cock. Three ther persons suffered amputation of a total of 9 fingers and 2 of these lso had arms broken when caught in auxiliary generator drive belts

hat were not properly protected. Because of limited space within odies and under hoods of Diesel-electric locomotive units, complete rotection of moving and rotating parts is essential if accidents are

o be avoided.

cies found.

Three crankcase explosions and 2 fires about Diesel engines resulted n injuries to 6 persons. Electrical fires in engine compartments, bout units, short circuits and explosions caused by flash-overs in lectrical cabinets caused injuries to 9 persons. Because of danger of res resulting from the liquid fuel and the high pressures and temperaares used in Diesel engines and the possibility of accident from

ectrical short circuits, a high standard of inspection and maintenance required at all times if accidents are to be avoided.

## SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and esting of Steam Locomotives, 45 specification cards and 1,036 alration reports were filed, checked, and analyzed. These reports are ecessary in order to determine whether or not the boilers represented ere so constructed or repaired as to render safe and proper service nd whether the stresses were within the allowed limits. Corrective easures were taken with respect to numerous discrepancies found. Under rules 328 and 329 of the Rules and Instructions for Inspecon and Testing of Locomotives Other Than Steam, 1,975 specificaons and 811 alteration reports were filed for locomotive units, and 39 specifications and 430 alteration reports were filed for boilers ounted on locomotive units other than steam. These were checked nd analyzed and corrective measures taken with respect to discreption; carrier's standard choke fitting in squirt hose pipe line was missing; one injured.

**July 15, 1953, locomotive 2720, East St. Louis, Ill. Boiler check stop valve bonnet blew out; threaded portion of bonnet was badly deteriorated and too small for proper fit in valve body; one injured.

August 17, 1953, locomotive 1820, Paducah, Ky. Injector water valve extension handle was broken off through cotter pin hole; break occurred through old

fracture; one injured.

Three accidents; three injured.

## MISSOURI PACIFIC RAILROAD:

October 12, 1953, locomotive 1257, Smackover, Ark. Blow-off cock was hard to operate; excessive accumulation of scale around operating valve stem and

inside of valve stem bushing; one injured.

June 15, 1954, locomotive 9734, El Dorado, Ark. Employee fell when extension handle became disconnected from air compressor steam valve on steam turret; valve stuck in closed position; valve stem threads excessively worn and cotter pin missing; one injured.

Two accidents: two injured.

## NEW YORK CENTRAL SYSTEM:

**August 5, 1953, locomotive 3322, near Hudson Lake, Ind. Leaking gaskets at top and bottom of water test glass; one injured.

August 20, 1953, locomotive 5405, Bryan, Ohio. Broken nipple in steam line

to coal pusher mechanism; one injured.

December 7, 1953, locomotive 6777, Jackson, Mich. Hinged cab seat fell from raised position; no receptacle on cab floor or other means provided for securing the lower end of bar which supported seat in raised position; one injured,

February 5, 1954, locomotive 1989, near Cory, Ind. Main steam pipe failure: a thin and defective section approximately 6 x 16½ inches was broken from pipe wall; no test holes on side of pipe where failure occurred, though thickness at test holes in other parts of pipe varied from 3/4 inch to 11/4 inches; two injured.

Four accidents; five injured.

## NEW YORK, CHICAGO & St. LOUIS RAILROAD:

July 11, 1953, locomotive 743, Sheffield, Ohio. Superheater flue failed due to being thinned by einder cutting; all small flues and five large flues near the failed flue were honeycombed and plugged with cinders, causing excessive draft on the remaining flues; one injured.

One accident: one injured.

## NORFOLK & WESTERN RAILWAY:

December 3, 1953, locomotive 127, Luray, Va. Gangway handhold broke through old fracture at bend near top connection to cab wall; one injured.

One accident: one injured.

### NORTHERN PACIFIC RAILWAY:

August 9, 1953, locomotive 2662, Staples, Minn. Air compressor was inoperative; employee was injured while attempting to get compressor started: "Both air pumps need oil" was reported before locomotive was placed in service; one

One accident; one injured.

## PENNSYLVANIA RAILROAD:

August 23, 1953, locomotive 6753, near Columbia, Pa. Injector operating lever became disengaged from quadrant; lever was worn at fulcrum pin and improper repairs had been made which interfered with movement of the lever; injector was reported hard to operate on August 11, 12, 16, 17, and 23 (three times) before the locomotive left the terminal; one injured.

September 26, 1953, locomotive 6782, Huntingdon, Pa. Squirt hose valve

worked open; valve was defective; one injured.

**November 23, 1953, locomotive 7562, Logansport, Ind. Injector operating lever flew back suddenly due to guide pin coming out of lever; cotter pin in end of guide pin had sheared, releasing guide pin; "Left injector falling apart" was reported on November 22; one injured.

Three accidents: three injured.

## PITTSBURGH & LAKE ERIE RAILROAD:

**September 24, 1953, locomotive 211, McKees Rocks, Pa. Insufficient clearance between cab and tender when on curve; one injured. One accident; one injured.

SOUTHERN PACIFIC—LINES WEST:

September 8, 1953, locomotive 4111, Oakland, Calif. Air compressor stopped;

September 9, 1953, locomotive 4169, Bayshore, Calif. Employee slipped on

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top of tender water tank and fell into open manhole; one injured.

September 29, 1953, locomotive 2825, Sunnyvale, Calif. Oil and water on cab deck and apron; one injured.

January 27, 1954, locomotive 1727, Fresno, Calif. Storm window storage bracket was not properly secured to cab wall; one injured.

February 2, 1954, locomotive 2700, Brawley, Calif. Headlight at rear of tender

did not meet the requirements of rule 129 (b); one injured.

**February 16, 1954, locomotive 3744, Chowchilla, Calif. Flames entered cab around fire door when flash occurred in firebox; upper half of fire door frame gasket was missing and blow-back valve was leaking; "Replace fire door gasket" was reported on February 2 and "Oil pipe leaks under left blow-off cock" reported on February 4 and 6; one injured.

May 18, 1954, locomotive 2554, Santa Clara, Calif. Insufficient clearance between cab vertical handhold and tender gangway ladder and tender deck bracket;

June 22, 1954, locomotive 2355, Niland, Calif. Presence of oil caused fireman's

foot to slip from step leading to indicator box; one injured.

June 25, 1954, locomotive 2746, Los Angeles, Calif. Sudden gush of hot water from hydrostatic lubricator filler plug opening; lubricator steam valve was frozen in open position and turret steam valve was leaking excessively; one injured.

Nine accidents; nine injured.

## Union Pacific Railroad:

January 27, 1954, locomotive 1905, Laramie, Wyo. Packing nuts at steam fountain were leaking; "Repack all valve stems at fountain" was reported on January 20 and 23; one injured.

One accident; one injured.

## ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1954, BY ROADS

[A double star (**) indicates accidents not properly reported, as required by rule 335. Complete investigations, therefore, could not be made, inasmuch as the Bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.]

## ATCHISON, TOPEKA & SANTA FE RAILWAY:

December 21, 1953, unit 2438, Argentine, Kans. Ice and snow on running board; one injured.

January 6, 1954, unit 2725, Purcell, Okla. Spring clasp type catch on cab door which was attached to handrail to secure cab door in open position was hard to apply and release; one injured.

March 19, 1954, unit 410, Cassoday, Kans. Swivel-type cab seat fell from stand; stove bolts for fastening seat to stand were missing; no means provided

for locking or securing stove bolts in position; one injured.

**April 17, 1954, unit 2264, Slaton, Tex. Main generator did not load properly. While attempting repairs, employee's hand and arm were caught in drive belts and pulley of auxiliary generator exciter unit through opening between the auxiliary generator and main generator frames; auxiliary generator drive belts were not adequately guarded; one injured.

Four accidents; four injured.

#### ATLANTIC COAST LINE RAILROAD:

February 12, 1954, unit 638, Wilmington, N. C. Cab door was difficult to open; bent and improperly applied hasp on door fouled on cab wall at top of door opening; one injured.

One accident; one injured.

## BOSTON & MAINE RAILROAD:

July 29, 1953, unit 4217-A, Williamstown, Mass. Breakage of traction motor blower belt threw off the second of three belts and caused misalinement of the remaining belt; one injured.

One accident; one injured.

CHICAGO. MILWAUKEE, ST. PAUL & PACIFIC RAILROAD:

August 2, 1953, unit 96-C, St. Paul, Minn. Fire in engine room of unit caused by breakdown of insulation on wires in auxiliary generator leads to high voltage cabinet and resulting short circuit; wires were in metal conduit lying at base of main generator pit where oil and moisture leaking from the engine and appurtenances accumulated and eventually caused failure of the insulation; one injured.

November 3, 1953, unit 37-C, Newtown, Mo. Crankcase explosion caused by an overheated connecting rod bearing; a cleaning rag, found in intake end of lube oil manifold, covered oil passage to the main bearing through which the connecting

rod bearing received lubrication; one injured.

May 28, 1954, unit E-11, Avery, Idaho. Employee electrocuted by contact with an electrically energized part of locomotive; one killed.

Three accidents; one killed, two injured.

## CHICAGO, ROCK ISLAND & PACIFIC RAILROAD:

February 3, 1954, unit 471, El Reno, Okla. Crankcase explosion; crankcase exhauster was inoperative; lower part of exhauster discharge pipe was obstructed with sludge; one injured.

June 25, 1954, unit 750, Hallam, Nebr. A false flange on a slid-flat driving wheel, resulting from a seized traction motor pinion bearing on a Diesel-electric locomotive unit. displaced a rail and caused derailment of 2 locomotive units and 11 cars of a passenger train; 189 injured.

Two accidents; 190 injured.

#### DELAWARE & HUDSON RAILROAD:

October 24, 1953, unit 4010, Oneonta, N. Y. Diesel engine failed to speed up properly during a switching movement due to defective control equipment, and cut of cars being shifted collided with remainder of the train; throttle handle support was worn on cam shaft and one of two springs at star wheel was weak;

One accident; one injured.

## DENVER & RIO GRANDE WESTERN RAILROAD:

**August 8, 1953, unit 119, Denver, Colo. Front uncoupling levers were hard to operate; uncoupling levers and yoke were bent; one injured.

March 31, 1954, unit 5202, Denver, Colo. Steps at rear corner of unit were slippery due to accumulation of snow and ice; one injured.

Two accidents; two injured.

## ERIE RAILROAD:

July 16, 1953, unit 734-D, near Ashville, N. Y. Crankcase explosion; weld between top and bottom of No. 4 piston burned off for approximately 70 percent of circumference; top oil ring and compression rings broken; side of top piston member burned; piston worn at wrist pin fit and piston and liner badly scored; one injured.

**August 2, 1953, unit 1008, near Burbank, Ohio. Oil on walkway in engine compartment; gasket joint on lubricating oil strainer was leaking; strainer element

had been renewed on the preceding day; one injured.

August 12, 1953, unit 520, Meadville, Pa. Employee fell when attempting to board unit; top of metal strap forming outside frame of bottom gangway step tread was worn smooth; one injured.

September 4, 1953, unit 19, New York, N. Y. Reducing valve pipe and feed valve pipe were leaking under the floor of front operating cab; "Air compressor will not keep air up * * *" was reported on September 3; one injured. October 1, 1953, unit 707-D, Maybrook, N. Y. Fires on unit caused by

grounded high voltage cable; one injured.

October 21, 1953, unit 800-A, Ohio City, Ohio. Employee's foot slipped from bottom stirrup step of gangway ladder when boarding unit; tread of step was rolled inwardly and curving outer edge was worn smooth; tread was approximately

23 inches above the top of the rail; one injured.
February 2, 1954, unit 862, Waldwick, N. J. Spot welds applied on cab step for roughening were worn smooth at outer edge of step; one injured.
June 13, 1954, unit 302, Jersey City, N. J. Employee slipped on oil on front platform of unit; oil pipe flange, nipple, and hose connections in lubricating oil line were leaking, permitting oil to fall on floor inside equipment hood and run onto front platform, running boards, and right front step; one injured.

Eight accidents; eight injured.

### INDIANA HARBOR BELT RAILROAD:

**October 10, 1953, unit 8845, Blue Island, Ill. Cab seat back rest bracket broke; back rest bracket was badly bent; one injured.

One accident, one injured.

### KENTUCKY & INDIANA TERMINAL RAILROAD:

May 2, 1954, unit 54, Louisville, Ky. Employee's clothing became entangled around the moving and unguarded fan shaft on Diesel-electric unit when he attempted to obtain a water sample from the water-glass drain cock; location of water cock was such as to cause employees to assume an awkward and uncomfortable position when taking water samples from left side of the fan; one killed.

One accident: one killed.

#### LOUISVILLE & NASHVILLE RAILROAD:

**February 15, 1954, unit 2221, Montgomery, Ala. Front cab door was difficult to release from latched open position; handle on door was inadequate and improperly located for safe use in supplying force necessary to disengage door from spring latch on outside wall of cab; one injured.

One accident: one injured.

### MAINE CENTRAL RAILROAD:

April 11, 1954, unit 671-A, North Concord, Vt. Oil on engine-room floor due to lubricating oil drain pipe connection to suction strainer box leaking; oil on engine room floor was reported on March 12, 14, 16, 19, 20, and April 5 and 12; one injured.

One accident; one injured.

## MISSOURI-KANSAS-TEXAS RAILROAD:

February 23, 1954, unit 1572, Osage, Okla. Engine did not load up properly; two of the auxiliary generator drive belts were too long and were found out of their sheaves and riding on top of other belts; engine had been reported not loading up properly on February 7 and 16; auxiliary generator drive belts were not adequately guarded; one injured.

One accident; one injured.

## NEW YORK CENTRAL SYSTEM:

August 28, 1953, unit 4061-A, Toledo, Ohio. Cab door stop was hard to operate; movable members of door stop were stuck by hardened sprayed paint;

**September 8, 1953, unit 620, Detroit, Mich. Sandbox cover was hard to raise; cover weighed 141½ pounds and cover hinges were rusty; one injured. September 27, 1953, unit 8346, near Germantown, N. Y. Right front cab window blew from frame and struck an occupant of the cab while unit was running at high speed; window was not proper fit in frame; one injured.

January 22, 1954, unit 8290, Syracuse, N. Y. Cab seat steelplate pedestal broke at top end adjacent to fusion weld which joined the hollow shaft to pedestal;

one injured.

January 30, 1954, unit 9308, Selkirk, N. Y. Cab seat broke away from cab

floor; base of seat was insecurely fastened to floor; one injured.

**April 15, 1954, unit 8592, Troy, N. Y. Excessive fuel-oil and exhaust fumes in cab; because of water, rust and sediment in fuel system, three of six injection nozzles were stuck in open position and failed to atomize heavy discharges of fuel oil in the cylinders; two injured.

**June 26, 1954, unit 9629, Cleveland, Ohio. Cab seat back rest broke loose, causing employee to fall; locking pin for adjusting back rest had become disengaged from locking plate; locking plate was bent out of line at bottom and

holes in plate were badly distorted; one injured. Seven accidents: eight injured.

## NEW YORK, CHICAGO & St. LOUIS RAILROAD:

January 17, 1954, unit 125, East St. Louis, Ill. V-belts driving exciter and auxiliary generator shaft were not properly guarded, permitting employee's finger to be caught under front belt; one injured.

One accident; one injured.

## NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

**August 17, 1953, unit 0422, Bay Ridge, N. Y. Oil on engine room floor; oily floor was reported two times on August 12, and "H. P. fuel pumps leaking" was reported on August 15; one injured.

September 22, 1953, unit 0748, New London, Coun. Oil on engine-room floor; engine-room floor reported to be cleaned 25 times since September 1; one injured.

February 1, 1954, unit 313, Stamford, Conn. Short circuit and electrical flash occurred due to breakdown of insulation in corded wire bundle from main AC transformer to auxiliary and control changeover switches; one injured

February 1, 1954, unit 0736, Myricks, Mass. Two cylinder head studs were broken causing fire about engine and excessive smoke and gas in engine room:

one injured.

February 5, 1954, unit 0710, Boston, Mass. Oil on engine-room floor at walkway; "Clean engineroom floor" was reported on 11 of 16 days immediately preceding the accident; one injured.

February 9, 1954, unit 0770, New Haven, Conn. Oil on engine-room floor: defective condition of floor resulting from leaks was reported 32 times in the

period, January 22—February 9, inclusive; one injured. February 11, 1954, unit 0752, Providence, R. I. Oil and water on boiler compartment floor resulting from loose and leaking crankcase drain plug of steam heating generator feed water pump; floors reported to be cleaned and/or oil leaks had been reported repeatedly; one injured.

February 27, 1954, unit 0740, near Old Saybrook, Conn. High pressure fuel injection pipe on No. 2 engine was leaking badly; one injured.

May 27, 1954, unit 0727, near Westbrook, Conn. Oil on engine-room floor; numerous oil leaks reported and engine room reported to be cleaned 16 times since May 10; one injured.

Nine accidents; nine injured.

#### NORTHERN PACIFIC RAILWAY:

March 10, 1954, unit 5406-A, near Quendall, Wash. Air hose supplying main contactors separated from fitting, allowing contactor to open under load; hose had not been properly applied; one injured.

One accident; one injured.

## PENNSYLVANIA RAILROAD:

July 4, 1953, unit 8720, Mayville, N. Y. Load ammeter on engineer's control panel exploded, showering shattered glass; brush shunt on No. 1 traction motor, which was loose, grounded on frame and caused a heavy electrical surge in high voltage system and, due to a ground in ammeter, caused explosion in ammeter before function of the tripped ground relay was completed; apparently the spiral lead in ammeter was not properly insulated; no protection from shattered glass in case of ammeter breakage was provided; one injured.

August 21, 1953, unit 7853, New York, N. Y. Bus bars from preventive coils to transformer power contactor grounded at bus bar support, due to insulation failure, and sparks ignited snow curtains which were stored below; one injured.

September 12, 1953, unit 4710, near Quarryville, Pa. Cab order lamp conduit support clamp dropped from conduit and struck employee; nuts on bolts holding the two members of conduit clamp worked off; one injured.

September 24, 1953, unit 9700-A, Kane, Pa. Explosion and fire occurred in

electrical control cabinet in cab of leading unit; two injured.

**November 25, 1953, unit 9703-B, Tome, Md. Insufficient head clearance under engine cooling system air duct which was suspended from the roof and padding protection not provided on angled parts of the duct; one injured.

December 8, 1953, unit 9547-A, Altoona, Pa. Diesel engine air box inspection hole cover plate became disengaged from fastening and blew off; one injured.

January 14, 1954, unit 5879-A, Williamsport, Pa. Sliding rear end door of unit was stuck in closed position; supporting member at top of door was loose, allowing door to drop down on lower runner; three screws were broken and remaining screws were loose in the top supporting member; one injured. February 1, 1954, unit 5757-A, Cleveland, Ohio. Bonnet nut of steam heat

end valve blew off; threads on valve body were corroded and wasted away; valve wheel-type handle and bonnet nut showed evidence of the use of hammer and

chisel in tightening; one injured.

February 15, 1954, unit 4904, Washington, D. C. Steam heating boiler backfired through open fire door when attempt was made to relight it; burner would not go on high flame; difficulty in keeping boiler lighted was due to oil-pressure failure; upper fuel line strainer was missing and no gaskets in strainer cap and lower fuel line strainer was stopped up; two injured.

February 21, 1954, unit 5822-A, Pitcairn, Pa. Oil on engine-room floor caused by oil leakage at crankcase-engine bed joint due to loose frame bolts; "Engine leaking oil" was reported on February 19, and floor was reported to be cleaned on February 8, 17, and 19; one injured.

**March 18, 1954, unit 9705-B, Pitcairn, Pa. Diesel engine crankshaft failed through old fracture in No. 1 erankweb; one injured.

June 9, 1954, unit 9004, Philadelphia, Pa. Tread of bottom step on side of unit broke off through welds to end supports at both ends; one injured.

Twelve accidents: 14 injured.

#### SEABOARD AIR LINE RAILROAD:

December 1, 1953, unit 1402, Baldwin, Fla. Footboard was deteriorated and piece broken from outside end; one injured.

One accident; one injured.

#### SOUTHERN RAILWAY:

August 22, 1953, unit 4211, near Ellenwood, Ga. Flash from high voltage cabinet in engine room of trailing unit burned employee who had opened cabinet doors and was attempting to determine the cause of unit not delivering full power; engine on trailing unit did not operate at speed corresponding with throttle position in operating cab due to defective "B" solenoid coil in governor; one injured.

April 20, 1954, unit 4176, near Hurt, Va. Unbalanced air pressure between operating cab and engine room caused sudden closing of compartment door; no means provided to prevent violent movement of passageway door; one injured.

Two accidents: two injured.

## SOUTHERN PACIFIC—LINES WEST:

July 27, 1953, unit 6416, Colton, Calif. Employee stumbled on a ½-inch rise in walkway in unit, over the car body bolster cover plate, and fell; one injured.

October 17, 1953, unit 6366, Los Angeles, Celif. Employee fell when stairway between cab and engine room gave way; stairway had not been properly replaced

after removal for adjustment of reverser; one injured.

**November 7, 1953, unit 6439, Indio, Calif. Employee's head struck a steel bracket which protruded 5½ inches from the cab wall into the nose of the unit; bracket which had been applied to support automatic train stop equipment was not taken off when this equipment was removed; one injured.

December 11, 1953, unit 6325, Santa Barbara, Calif. Shattered glass on cab floor from radio instruction chart frame caused employee to slip and fall; one

December 15, 1953, unit 5272, Tarzana, Calif. Cab steps were badly bent;

one injured.

March 8, 1954, unit 1461, Los Angeles, Calif. Step at front corner of unit fell off, due to failure of spot welds applied to secure it at ends; step had no other

support than the spot welds; one injured.

April 16, 1954, unit 6363, Yuma, Ariz. Broken train indicator numeral lying on the floor of nose of unit caused employee to slip and fall; metal floor in nose

was not roughened; one injured.

April 24, 1954, unit 5904, Tucson, Ariz. Bonnet blew out of steam heat shut off valve at rear of unit; gate valve fulcrum pin on inside of shut off valve was disconnected and threads on valve body were badly worn; one injured.

June 26, 1954, unit 1383, Los Angeles, Calif. Oil on running board; one injured.

Nine accidents; nine injured.

### TEXAS & PACIFIC RAILWAY:

May 4, 1954, unit 1565, near Jal, N. Mex. Oil on engine-room floor; oil leaks from crankcase covers and front valve cover; one injured.

One accident; one injured.

#### Union Pacific Railroad:

September 25, 1953, unit 1502-B, near Goff, Oreg. Fire occurred in V bank of D-E engine; engine running very hot due to leaking radiator hose; cylinder head cover over Nos. 15 and 16 cylinders was bent and improper fit, permitting hot lube oil to pass into bank of engine and on to base of hot exhaust manifold where it became ignited; "Engine shut down due to running hot" was reported en route and the repairs made were inadequate; two injured.

One accident; two injured.

## VIRGINIAN RAILWAY:

October 18, 1955, unit 28, near Matoaka, W. Va. High tension bus line failed at connection to bracket on top of insulator and flashed to ground; one injured. One accident; one injured.

#### WABASH RAILROAD:

October 17, 1953, unit 129, Decatur, Ill. Steps to rear platform did not have proper nonskid protection; one injured.

One accident; one injured.

Table XII.—Number of steam locomotives inspected,

Squirt noise	6 1 1 1 3 1 1
A Ashpans and mechanism	6 1 1 1 3 1 1
Blow-off cocks	1
S   Brake equipment	1
S   Brake equipment	1
Cousine and uniforms uteres   Cousine and piston rods   1	1
Cousine and uniforms uteres   Cousine and piston rods   1	1
14   Crown botts   1   1   6   1   1   1   1   1   1   1	1
Cylinder cocks and steam chests	3
Diving boxes, shoes, wedges, pedestals, and braces.   1	1
Diving boxes, shoes, wedges, pedestals, and braces.   1	1
Driving boxes, shoes, wedges, pedestals, and braces.   14	
Firebox sheets	
Frames, tail pieces, and braces, locomotive   3	
Frames, tender	1
Cages and gage fittings, arr   1	11
Handholds	2
Handholds	
Injectors and connections	
Lateral motion	i
Nation   N	ĭ
Nation   N	
Sacking nuts	
Plots and phot bealis	
41 Plugs and studs       2       1         2 Reversing gear       6       1       1         43 Rods, main and side, crankpins, and collars       2       5       5       1       1         44 Safety valves       1       7       1       4       4         45 Sanders       1       7       1       4       4         8 Springs and spring rigging       7       35       1       9       9       1       4         47 Squirt hose       2       1       4       4       4       4       4       5       4       5       4       5       4       5       4       5       4       5       4       4       5       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4	
Rods, main and side, crankpins, and collars   2   5   5   1   1	· <b></b> -
Sanders	·i
1	
1	
51 Steam valves 3 1 4 5 5 Steps 1 8 1 2 1 4 5 5 Tanks and tank valves 5 18 3 3 1 4	
51 Steam valves 3 1 4 5 5 Steps 1 8 1 2 1 4 5 5 Tanks and tank valves 5 18 3 3 1 4	
53 Tanks and tank valves 5 18 3 1 4	
£4   (Tollfolo holog	
56 Trucks, engine and trailing 4 1	
58 Valve motion 6 2 1 1	
59       Washout plugs       4       9       1       5       1         60       Stokers       1       1       5       1       1         61       Water glasses, fittings, and shields       3       19       3       1       2       2	
61 Water glasses, fittings, and shields 3 19, 3 1 2 2 62 Wheels 2 5	2
63 Miscellancous—Signal appliances, badge 5 12 1 2 1	2
plates, brakes (hand).  Number of defects 7 96 341 58 8 69 53 18 23	4,
Locomotives inspected 35: 230 3:1712 243 37 87 81 57 105	24 1
Locomotives defective 5 23 145 35 7 20 29 9 10	24 1 377 31
Locomotives ordered out of service.	24 1

found defective, and ordered from service, et cetera

Western	Chicago, Burlington & Quincy	Chicago, Milwaukee, St. Paul & Pacific	Chicago, Rock Island & Pacific	Chicago, St. Paul, Minneapolis & Omaha	Clinchfield	Colorado & Southern	Cuyahoga Valley	Denver & Rio Grande Western	Detroit, Toledo & Ironton	Duluth, Missabe & Iron Range	Erie	Florida East Coast	Forth Worth & Denver	Georgia & Florida	Georgia	Grand Trunk Western	Great Northern	Gulf, Colorado & Santa Fe	Illinois Central	Interstate
15	8	14		36		2	<b>-</b> -	3		3						1			1	
2		2		1				1		2			<b>-</b>							
3		9		3				1						<u>-</u> 2		1	6 1		4 8	
2 1	3	11		3						i					1	1 16	4		1	
48 11 2 2	8	37 14		32 5	<u>ī</u>	5		4		3		1				1	5		6	1
2		7		2		<u>-</u>		2				2				1			3	
		10		1 11								2				1 10	<u>-</u>		3	1
40	4					;		;											3 1	
$\frac{22}{6}$	14 9 1 2	16 8		22 8				8	3							$\frac{2}{2}$			$\frac{2}{2}$	
- 16	1 2	3		$\frac{1}{3}$		<u>ī</u>			3					<u>1</u>		<u>ī</u>			4	ī
7 37		14		5						1	\					3' 10	<u>-</u>		7	
31		1				,		] `,											1	
1		4				;										1			1	
4 1	3			4												1			1	
$\frac{2}{6}$	2 1	1		1									$\frac{1}{1}$				i		<u>i</u>	1
3	1 2	1 2		2		1				:	3		3			7	1		6	4
3 3 11	4	. 3	3	8					2							2	1		1 2 1	
28	7	23	3	19	jj	2			2		9	2	2	2		2	7		9	<u>ī</u>
<del>-</del> 7			[  }:	. 1					5		: :								2	$\bar{2}$
				. 1							5			1	1				4	
5			2	.				-	2											
1 13		17	7	15		1			ī		3	1	3	1					2 3 7	1
13	2	3	7	15	3						-		2							
<b>.</b>			4	-				-	2	-	-		2						<u>i</u>	
14 27		1	4		7	4		-	6	-	ī				1	4	1		6 2	1
10		1:	2	-	3			- i	ĩ:	-	2	j	i		1	9		3	1	
50 5	) :	5	1	- 10	1	1		-	2	-	o		2			7			13	
4	·	-	6	-  :	2			-		-	2					1			4	
1 5		-	3	-  1	5	- ;	:	-	2	-	1	·					;	i	1	
22 26	2	1 1 1 5 2	8	10	0	-	1	-	1	-	5				1	8 2		1	$\frac{2}{7}$	$\frac{2}{2}$
2	21		_	-   :	2					-			.  <i>.</i>						;	
38 14		7 2 2 1	2	1 3 2	8  7:		2 -	-	1	-	3					3 7 2 2		í	3	
8	5	_   '	7	-	1 3	1	1  2 _	-	3	-	7					7 2	2	1 	3 2 2	1
3		7 .	6	ī	2	-  :	1	-	1	-	2		-  2	2		2	2	1		
	5 :	3			3 7	1 .	i	-	1	-	3 7					7	3	3	2 2 3	
5	5		8	-	2	1 .	2 1	-	3		2		;	.     2	2	4		3 1	3	 
			<u> - </u>		-	-	<del>-</del> \	- -		-	_	-	_			100			154	
565	= ==	=	='===	6 29	= ===		=	=:==	3	= ===	3	1	=	===		-	=	===	:===	
393 806 142 17. 6	6 49 2 3	8 86 3 11	3 .0	2 8 4 24 2 5 0 20.	0	4 13 1 1	1	4 13 7 19 - 1 - 7.	$\begin{bmatrix} 0 & 1 \\ 5 & \dots \end{bmatrix}$	8 16 5 10 - 1		4 70 1 89	0 34 9 59 5 11. 9	15   8   8	5 17 5 5	149 258 37	34 33 7 2 3 7.	0 (*) 7 1 5 4	. 46	27

^{*}Atchison, Topeka & Santa Fe.

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Table XII.—Number of steam locomotives inspected, found

	Parts defective, inoperative or missing, or in violation of the rules	Lake Superior & Ishpeming		Louisville & Nashville		Minneapolis, St. Paul & S. S. Marie	Missouri Pacific	Monongahela	New York Central	New York, Chicago & St. Louis	Norfolk & Portsmouth   Belt Line	Norfolk & Western	Northern Pacific
1	Air compressors			5		3	6		23	1			12
$\frac{2}{3}$	Arch tubesAshpans and mechanism								<u>i</u>	<u>î</u>		2	1
4	Ashpans and mechanism Axles. Blow-off cocks Boiler checks Boiler shell. Brake equipment. Cabs, cab windows, and curtains. Cab aprons and decks. Cab decross and decks. Coupling and uncoupling devices. Crossheads, guides, pistons, and piston rods. Crown bolts. Cylinders, saddles, and steam chests. Cylinder cocks and rigging. Domes and dome caps. Draft gear. Draw gear.												
5	Boiler checks					2	2		21 55			3	8
7	Boiler shell			i			2		7	1	1	4	3
8	Brake equipment			5		5	31		114	3	1	34	40
9 10	Cab aprops and decks	i					10		28 28	3		23	5
îĭ	Cab cards	[					$\frac{7}{2}$		20				5
12	Coupling and uncoupling devices								2		(		1
13 14	Crossneads, guides, pistons, and piston rods					5	9	1	40 2		i	15	21
15	Cylinders, saddles, and steam chests	[::::i		1		8:	<u>3</u>		25	1		1 38	1 11
16	Cylinder cocks and rigging					2	ĭ		20			5	
17	Domes and dome caps								2			2	1
18 19	Draw gear	[]				2	4		5 7			4	1 10
20	Draw gear Driving boxes, shoes, wedges, pedestals,			2		i	1		32			22	3
	and braces. Firehox sheets		i	.		i				i	i		"
$\frac{21}{22}$	Firenox sneets								2			5	
23	Frames, tail pieces, and braces, locomotive					2	5		13	1		7	5
24	Frames, tender												1
25 26	Gages and gage fittings, air			:			1		2			8	3
27	Gage cocks						3		9			10	4
28	Grate shakers and fire doors						4		12			2 7	6
29	Handholds						2		16	3		2	5
30 31	Injectors, inoperative						$\begin{vmatrix} 2 \\ 2 \end{vmatrix}$	;	1 60			3	
32	Inspections and tests not made as required			"		3	1	1	5	11		20	19
33	Lateral motion			1		1	4		24	2		11!	
34 35	Lights, cab and classification								2	1		4	
36	Lubricators and shields			ī			1		3			3 11	
37	Mud rings						2		6	1			4
38	Packing nuts			1		6	13	2	30	1	l i	0	4
39	Pilots and pilot beams					3	2		25			11 4	
41	Plugs and studs					4	i		10		1 1	2	
42	Reversing gear					2			21	2		17	
43 44	Rods, main and side, erankpins, and collars.			5			4	3	56			14	6
45	Sanders			3			10		30	<u>i</u>		1 10	
46	Springs and spring rigging			ĭ			37	1	126	2		23	
47 48	Squirt hose			1		1	1		3				1
49	Driving boxes, shoes, wedges, pedestals, and braces. Firebox sheets. Flues. Frames, tail pieces, and braces, locomotive. Frames, tail pieces, and braces, locomotive. Frames, tender						1		14	3		2	5
50	Steam pipes			1			9		4				5
51	Steam valves			2			9		6			2	
52 53	Tanks and tank valves		2			2	8		59			5	
54	Telltale holes.	1		1					30				8
55	Throttle and throttle rigging			1			2		32	3		7	4
56 57	Throttle and throttle rigging						10		10	1		4	8
58	Valve motion					3 1	2	1	39 32			3 8	14 16
59	Washout plugs	1		1			4		7			1	5
60	Stokers.			2		1	2		10			i	
61	water glasses, fittings, and snields					1	8		40			14	9
63	Wheels Micellaneous-Signal appliances, badge						,		10	1		4	9
- 1	plates, brakes (hand)			3		1	8		40	3		12	12
	Number of defects					68	_		1, 237			429	
					-	=='	=			===			
	Locomotives reported	25	18		14			30	959				
- }	Locomotives inspected		30		26	286		15 2	$\frac{1,213}{288}$			$1,024 \\ 105$	914 120
	Percentage of inspected found defective Locomotives ordered out of service.		3.3	7.3			12.7	13.3	23.7		2. 4		

defective, and ordered from service, et cetera-Continued

Pennsylvania	Pennsylvania-Reading Seashore Lines	Pittsburgh & Lake Erie	Reading	Richmond, Fredericks- burg & Potomac	River Terminal	St. Louis-San Francisco	St. Louis Southwestern	Seaboard Air Line	Southern Pacific, lines east	Southern Pacific, lines west	Southern	Spokane, Portland & Scattle	Terminal R. R. Association of St. Louis	Union Pacific	Virginian	Wabash	Western Maryland	Western Pacific	Roads with less than 10, and industrial locomotives	Total defects	
42		2								55		1	5	13	5 2				12	304	
										12		<b></b>		<del>-</del>					1	4 24	
6									<u>î</u>	43		i	<u>ī</u>	1	<u>î</u>	<b>-</b>			1 2 7 6	$\frac{3}{121}$	
7		1							1 1	18 23			1	97						158 79	
64 19			4						6	162				91 32	12 2				35 15	835 298	;
7									$\frac{2}{2}$	43				8 3					15 8 5	133	10
										14										$\frac{27}{22}$	1:
24 1		1							11	91 4		<b>-</b> -	2	44	2				24 2 12	398 20	1:
$\frac{20}{15}$		1							i	82			ī	29 7	6				12 6	364 132	1
2									ĩ	3				4				<b>-</b>		20	1'
6									1	47 12		<u>ī</u>	1	16 3					10 6	150 79	1 2
13	<b>-</b>								1	65	¦			8	1		<del>-</del>		10	258	2
8				<b></b>						13	<b>-</b>			1						$\frac{37}{32}$	2
10									2 1	11 41				18	1				5 4 1 5 3 15 6 5 2 24 6 5 8	151	2
ē	<b>-</b>						<b>-</b>		₁	9 3 19				1	3				1 5	14	2
7 5									1 5	19				3 13 5 3 18	3 1 3 2 2				3	47 89 120	2
12									į	13				3	2				6	90	2
2									4	35   10		2			2		<b>-</b>		2	146 33 674 24 98	2 2 2 2 2 2 2 2 2 3 3 3 3 3 3
64			<b>-</b> -						2	159	'	1	1	97 4	5	1			24 6	674 24	3
7									4	159 3 6 2 13				6					5	98 39	3
3										13				17					5	56	3
3 3 2									$\frac{1}{2}$	18 21				6	1				6	63 65	3
$\frac{2}{32}$										85 19				4	4				23 10 2	240 154	3
<u>-</u>									1	12				5					2	52	4
23 17		1	ī						1	8 32				18	3				8	$\frac{22}{170}$	4
		2							4	60 6		' <b></b>	4	26	3				20	315 15	4
9 52		1	i						12	51 235				48 50	15	4		<b>-</b>	9 25	15 277 834	4
4									12 13 1 2 3	4				6					3	39	4
7									3			<b></b>		9	1				8 20 9 35 3 32 5 5 22 16	108 55	4 4
$\frac{7}{2}$										21 12				10 10					5 5	87 69	5
8 15									1 3	98		4		12 27					22	255 340	5
- 16									! 	1				1					5	13	5
16 7									5	22 39			1	8 24	3				11 6	$\frac{228}{171}$	5 5 5 5 5 5 5 5 5 5
8 11									1	15 41				6 19	3				16 4	$\frac{152}{174}$	5
1 14		2								4			1	2					6	79	5
28		3							i			1		1 13	3				- 11	$\frac{55}{282}$	6
7	<b></b>									17				2				! !	13	107	
7						<u></u>	!	! <b>_</b> _	5	65		·		41	1		! 		8	263	6
660		18	7			===			110	2167		11	22	833	90	7			536	9, 763	
1278 1439	29	62 70	66 123		17		15		107	834	58	15	29		101	50 4	48	10	639	12, 135	
188		11	3					,	; 27	2157 586		5	15	1801 191	232 26	2		1	118	19, 999 2, 599	
3, 1: 12		15.7	2.4						9.8	27. 2 31		$\frac{16.1}{2}$	27.8 1	$\frac{10.6}{8}$	11. 2 1	50.0			15. 2	13. 0 117	

Table XIII.—Number of locomotive units other than steam

	Parts defective, inoperative or missing, or in violation of the rules	Akron, Canton & Youngs- town	Alton & Southern	Ann Arbor	Apalachicola Northern	Atchison, Topeka & Santa Fe	Atlanta & St. Andrews Bay	Atlanta & West Point	Atlantic Coast Line	Baltimore & Ohio	Bangor & Aroostook	Belt Railway of Chicago	Bessemer & Lake Erie
1 2 4 5 6 8	Air compressors Axles, truck and driving Batteries Boilers Brake equipment Cabs and eab windows					5 1 4 83 25	1	 3 9	3 27 6	10 1 3 26 17	1 1		i
10 11	Cab cards Cab floors, aprons and deck plates. Clutches					8 88	1		18	32	5	2	
12 13	Controllers, relays, circuit breakers, magnet valves and switch groups. Coupling and uncoupling de-					18		1	14	3		<b></b>	
14 16 17	vices. Current collecting apparatus Draft gear Draw gear			1		16 8		1	6 1	4		1	
18 20 22 23	Driving boxes, shoes and wedges Frames or frame braces Fuel system					96 7		 1 1	 17	34 1 25	<u>-</u>		
24 25 26 28	Gages or fittings, steam Gears and pinions Handholds Inspections and tests not made					15				1 4			
29 30	as required. Insulation and safety devices Internal-combustion engine defects, parts and appurtenances.	2				8 248		1 1	1 61	3 113	14	2	
32 33 35 36	Jumpers and cable connectors					24 1				8			
36 37 39 40	Lights, cao and classification Lights, headlight Meters, voit and ampere Motors and generators Pilots and pilot beams					  37	1		1 5	4 39			
42 43 44 46	Pilots and pilot beams					4			1 				
48 49	shafts. Sanders Springs and spring rigging, driving and truck.					68 1		1	25 4	17 3		2	
51 53 54 55	Stay bolts, broken or defective— Steam pipes———————————————————————————————————					3 15		2 1	3 13	2 9		2	2
56 57	fuses. Transformers, resistors and rheo- stats. Trucks					15		7	<u>8</u>	8		1	
59 60 61 62	Water tanks Water glasses, fittings and shields Warning signal appliances Wheels					1 2 16			2 2	1 3 7			
63	Miscellaneous Number of defects	3	=====	1	' <del></del>	862	3	30	246	398	23	10	3
	Locomotive units reported Locomotive units inspected Locomotive units defective Percentage of inspected found defective.	15 19 2 10. 5	25	24 41 1 2. 4		1, 662 5, 336 443 8. 3	18 1	9	564 1, 785 125 7. 0	866 3,446 226 6.6		53 69 3 4.3	75 111 2 1.8
	Locomotive units ordered out of service.					5				1	3		

inspected, found defective, and ordered from service, et cetera

Birmingham Southern	Boston & Maine	Butte, Anaconda & Pacific	Canadian National	Canadian Pacific	Canton	Carolina & Northwestern	Central of Georgia	Central Railroad of New Jersey	Charleston & Western Carolina	Chesapeake & Ohio	Chicago & Eastern Illinois	Chicago & North Western	Chicago & Western Indiana	Chicago, Burlington & Quincy	Chicago Great Western	Chicago, Indianapolis & Louisville	Chicago, Milwaukee, St. Paul & Pacific	
2 3	13 21 10 5 63			1		2	31 11 10	3 2 2		31 9	1	56 39 1 38		3 30 9 2 15	12	1 1 1 9	13 1 3 85 53 10 51	2 4 5 6 8 9 10
	2	! 					8	1	2			14		7			6	11 12
2	3 3 3 41 4 2			2			15 2	7 2		5 1		9 6 1 34 4		7 3	4 1 4 1 24 1	1	3 16  5 41 3 1 1 7 2	13 14 16 17 18 20 22 23 24 25 26
5	5 166	1		6		i 2	2 5 2 52	2		1 2 14		17 2 <u>-</u> -		1 8 11	1 1 45		7 2 2 97	26 28 29 30
1	10			1 1 1			9 2	1		4		2 4 3 25 7		6	4	1	5 11 1 1 35 5	32 33 35 36 37 39 40 42 43 44 46
	10 2						3 4	4 2		13		54 12		19	8 13	5	33 37	48 49
	6 4						15	1		5		1 38		1 3	2	1 3	1 20 1	51 53 54 55
15						5		19		5	1				2	2	18 1 2 9 23	56 57 59 60 61 62 63
20 10 3	297 1, 393 191 13. 7	34 94 1		38 52 9	10 8	10 9 1	124 444	186 368 35 9. 5	31	699 1, 549 41	97 149 2	608 1,730 170		615	166 141 391 46 11, 8	57 238 19 8. 0	779 1,860 202	
	4						3	1	1			2		J. 0		1	10. 9	

Table XIII.—Number of locomotive units other than steam inspected,

FORTY-THIRD ANNUAL REPORT

	Parts defective, inoperative or missing, or in violation of the rules	Chicago River & Indiana	Chicago, Rock Island & Pacific	Chicago, St. Paul, Min- neapolis & Omaha	Chicago, South Shore & South Bend	Cincinnati Union Terminal	Cleveland Union Terminals	Clinchfield	Colorado & Southern	Colorado & Wyoming	Conemaugh & Black Lick	Delaware & Hudson	Delaware, Lackawanna & Western
1	Air compressors		25									3	4
2 4	Axles, truck and driving Batteries		3									<u>i</u>	
5	Boilers		18	1									
6	Brake equipment Cabs and cab windows		263 78	16 10				9	2			8 2	{
8	Cab cards		19									1	. <b></b>
10	Cab floors, aprons and deck		110	5	<b>-</b>			1				9	
1	plates. Clutches		9										
2	Controllers, relays, circuit break-		58					2				1	]
	ers, magnet valves and switch												
ι3	groups. Coupling and uncoupling devices.		16	4			<b></b> -					<b></b> -	1
14	Current collecting apparatus												
16	Draft gear		10 4	4				1	1			6	
17 18	Draw gear		10									ĭ	
20	Frames or frame braces											1	
20 22 23 24	Fuel system		120 11	17				2				43	. 2
24	Gages or fittings, air Gages or fittings, steam		8										
25 26	Gears and pinions		2										
26 28	Handholds	1	19 26	3				1				1	
	as required.		20										 
29 30	Insulation and safety devices Internal-combustion engine de-		12 284	$\frac{2}{13}$				2				107	35
32	fects, parts and appurtenances.  Jack shafts												
32 33 35	jumpers and cable connectors		21										. (
35	Lateral motion, wheels		;										
36 37	Lights, cab and classification Lights, headlight		4										
37 39 40	Meters, volt and ampere		3					1					
40	Motors and generators		47	1								5	12
42 43	Pilots and pilot beams		5										
43 44 46	Quills												
46	Rods, main, side, and drive shafts.												
48	Sanders		180	2								3	:
49	Springs and spring rigging,		11	8				2					
51	driving and truck. Stay bolts, broken or defective					İ				ĺ			
51 53 54	Steam pipes		21	1									
54 55	Steps, footboards, et cetera		35 2	2				1				6	
99	Switches, hand-operated, and fuses.											1	
56	Transformers, resistors and rhe- ostats.		1										
57	Trucks		53	3								2	
69 60	Water tanks		1	1					<b>-</b> -			2	1
57 5 <b>9</b> 60 61	Warning signal appliances		18									1	
62 63	Wheels	1	12					2	1			1	
63	Miscellaneous		72	3								5	
	Number of defects		1, 589	=	!===	====		24	=	:=		214	===
	Locomotive units reported Locomotive units inspected	27 58	534 2, 547	69 248			27	59 240				181 1, 148	21 60
	Locomotive units defective	. 3	518	32				14	2			115	3
	Percentage of inspected found	5. 2	20, 3	12.9				5.8	0.7			10.0	6.
	defective. Locomotive units ordered out of	1	11	1				2					
	service.						-						
	l	11		1	1	1	1	1	1	1	1	<u> </u>	<u></u>

found defective, and ordered from service, et cetera-Continued

4	Denver & Rio Grande Western	Detroit & Tolede Shore Line	Detroit Terminal	Detroit, Toledo & Ironton	Donora Southern	Duluth, Missabe & Iron Range	Duluth, South Shore & Atlantic	Elgin, Joliet & Eastern	Erie	Florida East Coast	Fort Dodge, Des Moines & Southern	Forth Worth & Denver	Georgia	Grand Trunk Western	Great Northern	Green Bay & Western	Gulf Coast Lines	Gulf, Colorado & Santa Fe
11       11       11       11       11       12       11       13       14       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15       15 <td< td=""><td>6</td><td></td><td>1 4</td><td></td><td></td><td></td><td>1</td><td>3332233</td><td>14 3 1 38</td><td>3</td><td></td><td>1</td><td>3</td><td>22 27</td><td>36 19</td><td>2</td><td>1</td><td>3</td></td<>	6		1 4				1	3332233	14 3 1 38	3		1	3	22 27	36 19	2	1	3
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46       7       4       99       8       23       39       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       24       22       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23	3 6							1	2	3				 			2	
46       7       4       99       8       23       39       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       24       22       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23       23							4	5	2	8		ī	1		2			1
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20	1								3									
3     2     2     2     2     3     3     5     5     2     5       2     2     2     2     5     4     5       4     1     3     12     6       31     1     3     11     2     10     7       281     9     1     2     2     12     39     260     45     3     12     7     151     235     2     8     8	2								i									
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11     2     2     2     2     3     4     5     4     5     5       4     3     3     3     3     3     3     3     6     6       31     1     3     11     2     10     7     10     7     6     6       281     9     1     2     2     12     39     260     45     3     12     7     151     235     2     8     8	3 6 2		2		2			2	1 7	<u>2</u>	3	3		5	5		2	
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4.1 4.0 1.7 5.1 4.2 12.0 0.8 7.0 12.7 0.5 2.8 5.9 20.8 5.5 2.0 0.8 0.8	217 , 400 58 4. 1	16 79	15 46 2 4. 3	38 60 1 1. 7	14 11 1 9. 1	16 24 1 4. 2	24 25 3 12. 0	155 191 13 6. 8	476 1, 366 104 7. 6	72 213 27 12. 7	18 31 2 6. 5	33 106 3 2.8	31 101 6 5. 9	67 192 40 20. 8		15 98 2 2. 0	84 246 2 0. 8	(1) 635 4 0. 6

¹ Atchison, Topeka & Santa Fe.

Table XIII .- Number of locomotive units other than steam inspected,

												7
Parts defective, inoperative or missing, or in violation of the rules	Gulf, Mobile & Ohio	Houston Belt & Terminal	Illinois Central	Illinois Terminal	Indiana Harbor Belt	Indianapolis Union	International-Great Northern	Jacksonville Terminal	Kansas City Southern	Kansas City Terminal	Kansas, Oklahoma & Gulf	Kentucky & Indiana Ter- minal
	,	_	3						8	i	İ	
Air compressors Axles, truck and driving	5		اه									
Batteries									1			
Boilers		:							1	:		
Brake equipment Cabs and cab windows	4 5	1 4	14 6		1		1		52 8	1	1	
Cab cards									1			
Cab floors, aprons and deck	5		5		4		2		25		3	
plates.											1	
Clutches.			3						<u>ŝ</u>			
Controllers, relays, circuit break- ers, magnet valves and switch	. '		ı o						·			
groups.												
Coupling and uncoupling de-		<b>-</b> -										
vices. Current collecting apparatus							1				ì	
Draft gear	4		1						4			
Draw gear												
Driving boxes, shoes and wedges. Frames or frame braces.					•				<u>-</u>			
Fuel system	15				3				23			
Gages or fittings, air	1		2						3			
Gages or fittings, steam			4						1			
Gears and pinions Handholds	1		4	4							2	
Inspectious and tests not made	î		î						3			
as required.	١.								١,	,		
Insulation and safety devices Internal-combustion engine defeats parts and appurtageness	$\frac{1}{22}$		18		2		2		111	$\frac{1}{2}$	6	
fects, parts and appurtenances.  Jack shafts		l										
Jumpers and cable connectors									2			
Lateral motion, wheels												
Lights, cab and classification Lights, headlight									1			
Meters, volt and ampere	2											
Motors and generators	4		3						20		2	
Pilots and pilot beams Plugs and studs	2		1	<b></b>								
Quills												
Rods, main, side, and drive shafts.												
Sanders	14	1	14		2	$i^{2}$			12		3	
Springs and spring rigging, driving and truck.									*			
Stay bolts, broken or defective.												
Steam pipes Steps, footboards, et cetera	3					<b></b>			1			
Switches, hand-operated, and												
fuses. Transformers, resistors and rheo-												
stats.			-		_		1				l	
Trucks	15		6		1				0			
Water tanks	1 4	[						1				
Water glasses, fittings and shields.			1						2			
Water glasses, fittings and shields. Warning signal appliances						1	1.	I	!	I		
Warning signal appliances Wheels			1						0			
Warning signal appliances			1 6	1					- 6			
Warning signal appliances Wheels	-	!==	99	5		-,	-	-	303	6	-	
Warning signal appliances Wheels Miscellaneous Number of defects Locomotive units reported	262	27	99	54	128	12	86	10	303	6	18	23
Warning signal appliances Wheels Miscellaneous Number of defects. Locomotive units reported Locomotive units inspected	262 850	27	99 314 9 956	54 49	128 165	12 104	86 279	10 35	303 143 6 658	6 17 73	18 73	23 24
Warning signal appliances Wheels Miscellaneous Number of defects Locomotive units reported Locomotive units inspected Locomotive units defective	262	27 99 99	99 7 314 9 956 2 23	54 49	128 165 5	12 104 1	86 279 2	10 35	303	17 73 3	18 73 9	23 24
Warning signal appliances Wheels Miscellaneous Number of defects Locomotive units reported Locomotive units inspected Locomotive units defective Percentage of inspected found defective	262 850 29	27 99 2	6 99 314 956 2 2 2 2 3 2. 4	54 49 1 2.0	128 165 5	12 104 1	86 279 2	10 35	303 143 6 658 87	17 73 3	18 73 9	23 24
Warning signal appliances Wheels Miscellaneous Number of defects Locomotive units reported Locomotive units inspected Locomotive units defective Percentage of inspected found defective Locomotive units ordered out of	262 850 29	27 99 2	99 7 314 9 956 2 23	54 49 1 2.0	128 165 5	12 104 1	86 279 2	10 35	303 143 6 658 87	17 73 3	18 73 9	23 24
Warning signal appliances Wheels Miscellaneous Number of defects Locomotive units reported Locomotive units inspected Locomotive units defective Percentage of inspected found defective	262 850 29	27 99 2	6 99 314 956 2 2 2 2 3 2. 4	54 49 1 2.0	128 165 5	12 104 1	86 279 2	10 35	303 143 6 658 87	17 73 3	18 73 9	23 24

found defective, and ordered from service, et cetera-Continued

	G	Lake Terminal	Lehigh & Hudson River	Lehigh & New England	Lehigh Valley	Long Island	Louisiana & Arkansas	Louisville & Nashville	Maine Central	Manufacturers Ry.	Minneapolis & St. Louis	Minneapolis, St. Paul & S. S. Marie	Minnesota Transfer	Mississippi Central	Missouri-Illinois	Missouri-Kansas-Texas	Missouri Pacific	Monessen Southwestern	
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	1	<del>.</del>						3									9		3
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1   21   5   10   37   1   3   3   3   3   3   3   3   3   3	-1-							1											:
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3	-)-					1					3	1					10		
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3.1  3.1  8.3  3.1  4.8  12.3  6.0  4.1  12.5  4.5  3.2  8.4  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.5  12.	1		24	3	29	8	7	71	29	8	182	344	24	37	1 22	888	2, 221	19	
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					Ι.							_							

Table XIII .- Number of locomotive units other than steam inspected,

Parts defective, inoperative or missing, or in violation of the rules	Monongahela Connecting	Monongahela	Montour	Nashville, Chattanooga & St. Louis	Newburgh & South Shore	New Orleans Public Belt	New York Central	New York, Chicago & St. Louis	New York, New Haven & Hartford	New York, Ontario & Western	New York, Susquehanna & Western	Norfolk Southern
Air compressors				1	1		21		12			
Axles, truck and driving												
Batteries				2			7					
Boilers							30		45			
Brake equipment				9			106	8	67			
Cabs and cab windows				3			88	1	53			
Cab cards				1			10	3	100			1
Cab floors, aprons and deck				э	1		171	0	166			
plates.												
Clutches Controllers, relays, circuit break-							43	2	11			
ers, magnet valves and switch							10	-	11			
gronps.												
Coupling and uncoupling de-				i			6		2			
vices.									_			
Current collecting apparatus		_							2			
Draft gear							23		12			
Draw gear							14					
Driving boxes, shoes and wedges.	1						19		46			
Frames or frame braces					;				3			
Fuel system.				3	1		277	3	176			1
Gages or fittings, air				1			8 8		7			
Gages or fittings, steam							2		- 4			
Gears and pinions							22		13			
Inspections and tests not made				i			7		9			1
as required.				_ ^			•					_
Insulation and safety devices							2		1			
Internal-combustion engine de-	1			19	4		455	5	460	1		1
footo parta and appartamence						1 1						
iects, parts and appuntenances.	ł											1
fects, parts and appurtenances, Jack shafts		   <b>-</b>						- <b></b> -			<b>-</b>	
Jack shafts Jumpers and cable connectors					- <b></b>		<u>2</u> 5				<b>-</b>	
Jack shafts		 							<u>-</u>			
Jack shafts Jumpers and cable connectors Lateral motion, wheels Lights, cab and classification							25 5		 3 1			
Jack shafts									3			
Jack shafts.  Jumpers and cable connectors.  Lateral motion, wheels.  Lights, cab and classification.  Lights, headlight.  Meters, volt and ampere.									3 1			
Jack shafts Jumpers and cable connectors Lateral motion, wheels Lights, cab and classification Lights, headlight Meters, volt and ampere Motors and generators.	1			3					3 1 1 21	2		
Jack shafts. Jumpers and cable connectors. Lateral motion, wheels. Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams.	1			3					3 1 1 21	2		
Jack shafts. Jumpers and cable connectors. Lateral motion, wheels. Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams. Plugs and studs.	1			3					3 1 21	<u>2</u>		
Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, cab and classification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams Plugs and studs Quills.	  1			3					3 1 1 21	2		
Jack shafts. Junpers and cable connectors. Lateral motion, wheels. Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams. Plugs and studs. Quills. Rods, main, side, and drive	1			3					3 1 21	2		
Jack shafts Jumpers and cable connectors. Lateral motion, wheels. Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams. Pluss and studs. Quills. Rods, main, side, and drive shafts.	1			3				8	3 1 21 21	2		
Jack shafts. Jumpers and cable connectors. Lateral motion, wheels. Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams. Plugs and studs. Quills. Rods, main, side, and drive shafts. Sanders.	1			3			5 3 43 5	8		2		
Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, cab and classification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams Plugs and studs Quills Rods, main, side, and drive shafts. Sanders Springs and spring rigging, driving and truck.	1			33			5 3 43 5  71	8	45	2		
Jack shafts.  Jumpers and cable connectors.  Lateral motion, wheels.  Lights, cab and classification.  Lights, headlight.  Meters, volt and ampere.  Motors and generators.  Pilots and pilot beams.  Pluss and studs.  Quills.  Rods. main, side, and drive shafts.  Sanders.  Springs and spring rigging, driving and truck.  Stay bolts, broken or defective.	1			3			5 3 43 5 71 26	8	45 11	2		
Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, cab and classification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams Plugs and studs Quills Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Stay bolts, broken or defective. Steam pipes.				13			5 3 43 5 71 26		45 11	2		
Jack shafts.  Jumpers and cable connectors.  Lateral motion, wheels.  Lights, cab and classification.  Lights, headlight.  Meters, volt and ampere.  Motors and generators.  Pilots and pilot beams.  Plugs and studs.  Quills.  Rods. main, side, and drive shafts.  Sanders.  Springs and spring rigging, driving and truck.  Stay bolts, broken or defective.  Steps, footboards, et ceters.	1			13			5 	8	45 11	2		
Jack shafts Jumpers and cable connectors Lateral motion, wheels Lights, cab and classification Lights, headlight Meters, volt and ampere Motors and generators Pilots and pilot beams Pluss and studs Quills Rods, main, side, and drive shafts. Sanders Springs and spring rigging, driving and truck Stay bolts, broken or defective Steam pipes Steps, footboards, et cetera.				13			5 3 43 5 71 26		45 11	1		
Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, cab and classification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams Pluss and studs Quills Rods, main, side, and drive shafts. Sanders Springs and spring rigging, driving and truck. Stay bolts, broken or defective Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and fnses.				13			5 		45 11	2		
Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, cab and classification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams. Plugs and studs. Quills. Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Stay bolts, broken or defective. Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and finses. Transformers, resistors and rhoo-				13			5 		45 11	1		
Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, cab and classification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams. Plugs and studs Quills Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Stay bolts, broken or defective. Steam pipes. Steps, footboards, et cetera Switches, hand-operated, and finses. Transformers, resistors and rheostats.				13			5 		45 11	1		
Jack shafts Jumpers and cable connectors. Lateral motion, wheels. Lights, eab and elassification. Lights, headlight. Meters, volt and ampere. Motors and generators. Pilots and pilot beams. Plugs and studs. Quills. Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Stay bolts, broken or defective. Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and fnses. Transformers, resistors and rhcostats. Trucks. Water tanks.				133			5 3 43 5 71 26 13 64 4		45 11 46 24 1	1		
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Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, cab and classification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams. Plugs and studs. Quills. Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Stay bolts, broken or defective. Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and finses. Transformers, resistors and rheostats. Trucks. Water glasses, fittings and shields.				1 1 1			5 33 43 5 71 26 	4	45 11 	1		
Jack shafts Jumpers and cable connectors Lateral motion, wheels Lights, cab and classification. Lights, headlight Meters, volt and ampere Motors and generators. Pilots and pilot beams Pluss and studs Quills Rods, main, side, and drive shafts. Sanders Springs and spring rigging, driving and truck Stay bolts, broken or defective Steam pipes Steps, footboards, et cetera. Switches, hand-operated, and finses. Trucks Trucks Water tanks Water glasses, fittings and shields. Water glasses, fittings and shields. Water glasses, fittings and shields. Warning signal appliances				1 1			71 26 29 1		45 11 46 24 1	11	1	
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Jack shafts Jumpers and cable connectors Lateral motion, wheels Lights, cab and classification. Lights, headlight Meters, volt and ampere Motors and generators. Pilots and pilot beams Pluzs and studs Quills Rods, main, side, and drive shafts. Sanders Springs and spring rigging, driving and truck. Stay bolts, broken or defective Steam pipes Steps, footboards, et cetera. Switches, hand-operated, and fnses. Transformers, resistors and rheostats. Trucks Water tanks. Water glasses, fittings and shields. Warning signal appliances Wheels Miscellaneous Loeomotive units reported Loeomotive units reported	1	26	1223	1 1 1 1 1 1 68 132 450	7	14 17	3 43 43 5 5 71 266 13 64 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	36 219 506	45 11 46 24 1 22 2 2 2 125 1,413 472 1,177	46 193 4		31 44 2
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Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, eab and elassification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams. Plugs and studs Quills Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Stay bolts, broken or defective. Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and finses. Transformers, resistors and rhoostats. Trucks. Water glasses, fittings and shields. Warning signal appliances. Wheels. Miscellaneous Number of defects. Loeomotive units reported. Loeomotive units reported. Loeomotive units reported. Loeomotive units inspected. Loeomotive units inspected. Loeomotive units inspected. Percentage of inspected found defective.	1 1 34 500 3 3	26 10	122 23	1 1 1 1 1 68 132 450 20 4.4	7 17 9 5	14 17	3 43 43 5 5 71 266	2 36 219 506 20	45 11 46 24 1 1 24 3 2 2 2 2 2 2 2 125 1, 413 472 1, 177 415 35.3	46 193 4	28 20 1	31 44 2
Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, cab and classification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams Plugs and studs Quills Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Stay bolts, broken or defective. Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and finses. Transformers, resistors and rheostats. Water tanks. Water tanks. Water glasses, fittings and shields. Warning signal appliances Wheels. Miscellaneous  Number of defects.  Loeomotive units reported Loeomotive units inspected Loeomotive units offective. Percentage of inspected found defective. Locomotive units ordered out of	1 1 34 500 3 3	26 10	12233	1 1 1 1 1 1 1 1 2 450 20	7 17 9 5	14 17	3 43 43 5 5 71 266	2 36 219 506 20	45 11 46 24 1 24 3 2 2 2 2 125 1, 413 413 472 415	46 193 4	28 20 1	31 44 2
Jack shafts Jumpers and cable connectors. Lateral motion, wheels Lights, eab and elassification. Lights, headlight. Meters, volt and ampere Motors and generators. Pilots and pilot beams. Plugs and studs Quills Rods, main, side, and drive shafts. Sanders. Springs and spring rigging, driving and truck. Stay bolts, broken or defective. Steam pipes. Steps, footboards, et cetera. Switches, hand-operated, and finses. Transformers, resistors and rhoostats. Trucks. Water glasses, fittings and shields. Warning signal appliances. Wheels. Miscellaneous Number of defects. Loeomotive units reported. Loeomotive units reported. Loeomotive units reported. Loeomotive units inspected. Loeomotive units inspected. Loeomotive units inspected. Percentage of inspected found defective.	1 1 34 500 3 3	26 10	1223	1 1 1 1 1 68 132 450 20 4.4	7 17 9 5	14 17	3 43 43 5 5 71 266	2 36 219 506 20	45 11 46 24 1 1 24 3 2 2 2 2 2 2 2 125 1, 413 472 1, 177 415 35.3	46 193 4	28 20 1	31 44 2

found defective, and ordered from service, et cetera-Continued

Northern Pacific	Northern Pacific Terminal	Northwestern Pacific	Pacific Electric	Patapsco & Back Rivers	Pennsylvania	Pennsylvania-Reading Seashore Lines	Peoria & Pekin Union	Philadelphia, Bethlehem & New England	Piedmont & Northern	Pittsburgh & Lake Erie	Pittsburgh & West Virginia	Reading	Richmond, Fredericksburg	Rutland	Sacramento Northern	St. Louis-San Francisco	St. Louis Southwestern	
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3					29		1									4	ĩ	
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			1		13			!	1	1				2		4	1	1

Table XIII.—Number of locomotive units other than steam inspected,

	Parts defective, inoperative or missing, or in violation of the rules	Savannah & Atlanta	Seaboard Air Line	South Buffalo	Southern Pacifie, lines east	Southern Pacific, lines west	Southern	Spokane International	Spokane, Portland & Seattle	Steelton & Highspire	Tennessee Central	Tennessee Coal & Iron Division	Terminal R. R. Association of St. Louis
1 2	Air compressors Axles, truck and driving		1			17	40 1				2	<u>1</u>	
4 5	Batteries Boilers						11 15		1			19	
8	Brake equipmentCabs and cab windows	<u>1</u>	40 11		$\frac{9}{2}$	100 59	166 48		23			$\frac{19}{22}$	
9 10	Cab floors, aprons and deck		32		5	$\frac{3}{184}$	6 82		1			7	
11 12	plates. Clutches Controllers, relays, circuit break-		<u>-</u> 6		2	4	52		<u>1</u>				
	ers, magnet valves and switch groups.	İ					:						
12	Coupling and uncoupling de- vices.		3			22	4						
14 16 17	Current collecting apparatus Draft gear		<del>7</del>		2	$1\overline{2}$	20				1	3	
18	Draw gear		3.				5 5						
20 22 23 24	Frames or frame braces	₁	$-\hat{39}$		4	189	128				1	17	
23	Gages or fittings, air		4			4	16 8		3				
25 26	Gages or fittings, steamGears and pinions						2						
26 <b>2</b> 8	Inspections and tests not made		15 6			7	8 5						
29 30	as required. Insulation and safety devices Internal-combustion engine defects, parts and appurtenances.		$\begin{array}{c} 1 \\ 71 \end{array}$		6	5 388	5 350		10		16	33	12
32	Jack shafts				1	<u>-</u>	<u>-</u>						
33 35	Jumpers and cable connectors Lateral motion, wheels		·		·								
36	Lights, cab and classification				¦	28	9						
37 39	Meters, volt and ampere		1	1			7					1	
40 42	Lights, eab and classification Lights, headlight Meters, volt and ampere Motors and generators Pilots and pilot beams		9		4	76	81 6					2	
43	riugs and studs												
44 46	Quills Rods, main, side, and drive				! !								
48	shafts. Sanders	1	61		10	47	90	ļ			1	1	4
49	Springs and spring rigging, driv-				ı s		13					2	
51	ing and truck. Stay bolts, broken or defective					   <u>-</u>							
53 54	Steps, footboards, et cetera	4	7 37		5	2 41 5	15 40 3		'			2	6
55 56	Switches, hand-operated, and fuses.  Transformers, resistors and rheo-					5							
	stats.		16		3	10	44					3	
57 59	Trncks Water tanks						7						
60 61	Water glasses, fittings and shields. Warning signal appliances		4			1	10					2	
62 63	Wheels Miscellaneous		14	! <b>-</b>	<u>1</u>	6 76			2		4	3 5	
Ųð.	Number of defects	11				1, 320	!		42		28		
		-						===			==		
	Locomotive units reportedLocomotive units inspected	. 27	1,561	322	922	3, 793	3.540	· 20	331	18	61	22	152
	Locomotive units defective Percentage of inspected found	• 5		$\begin{bmatrix} 1 \\ 0.3 \end{bmatrix}$	. 32	593	401 11.3	' 1			19.7	50.0	
	defective. Locomotive units ordered out of	1	1		1		1	1		!	2		į
	service.		:	į <u>-</u>	1	. •	i				1	\	
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found defective, and ordered from service, et cetera-Continued

Texas & Pacific	Texas Mexican	Toledo, Peoria & Western	Toledo Terminal	Toronto, Hamilton & Buffalo	Union Pacific	Union Railroad	Union Railway	Virginian	Wabash	Washington Terminal	Waterloo, Cedar Falls & Northern	Western Maryland	Western Pacific	Youngstown & Northern	Roads with less than 10, and industrial locomotive units	Total defects	
2 4	1				33 9 1 125 29 4 58	1 1			11 26		1		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		115 28 17 30	4 82 175 2, 126 858 135 1, 703	
					58			2	1				2		11	454	11 12
2		2			3 3 26 4 13 142 143 14 143 14 15 15 16 16 17 17 17 17 17 17 17 17 17 17 17 17 17	1 3 3	1	1	25				99		21 24 28 9 755 2 2 1 1 1 23 3 1 1 21 2 21	12 291 55 154 32 1,951 136 56 12 230 185 105 4,848 178 5 232;28 40 813 71	13 14 16 17 18 20 22 23 24 25 26 28 29 30 32 33 35 36 37 39 40 42 43 44 46 48
12	1 18		-	100	10 4 27 12 2 15 1 17 7 216 1,495	3 	1	5	2	26		104	1 1 1 11 57	10	607	1, 200 241 154 622 34 6 503 34 11 121 257 1, 005 19, 640 27, 135	48 49 51 53 54 55 56 60 61 62 63
609 5 0.8	22 1 4. 5	14 2	57	3	4, 557 466 10. 2	80 11 13. 7	52 1	66 3	1, <b>24</b> 6 52	8	14 1		508 21 4. 1	14 14 28.6	2, 181 228	83, 338 7, 395 8, 9	