FOURTEENTH ANNUAL REPORT

OF THE

CHIEF INSPECTOR OF MACHINERY

FOR THE

YEAR ENDING DECEMBER 31ST, 1915

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA.

PRINTED BY
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1916.

To His Honour FRANK STILLMAN BARNARD,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I beg respectfully to submit the Fourteenth Annual Report of the Chief Inspector of Machinery for the year ended December 31st, 1915.

THOMAS TAYLOR,

Minister of Public Works.

Victoria, B.C., January, 1916.

REPORT OF THE CHIEF INSPECTOR OF MACHINERY.

NEW WESTMINSTER, B.C., January 3rd, 1916.

The Honourable the Minister of Public Works,
Victoria, B.C.

SIR,—In accordance with the "Boilers Inspection Act," I have the honour to submit to you the Fourteenth Annual Report of the operation of the steam-boilers and machinery inspection service for the year ending December 31st, 1915.

The personal of the service at present consists of the Chief Inspector, thirteen District Inspectors, one clerk, and three stenographers, located as follows: Chief Inspector, four Inspectors, one clerk, and one stenographer and typist at the head office in New Westminster for District A; three Inspectors and one stenographer and typist in Victoria for District B; one Inspector in Nelson for District C; four Inspectors and one stenographer in Vancouver for District D; and one Inspector in Revelstoke for District E.

The following is a summary of the work performed in the office of the Chief Inspector during the year, exclusive of inspections and engineers' examinations, details of which will be found in the report of the Inspectors for the different districts and that of the Chief Examiner:—

Letters inward	4,785
Letters outward	5,144
Telegrams inward	64
Telegrams outward	55
Inspectors' monthly reports examined	156
New designs examined, calculated, and reported on	61
Amendments to designs calculated and reported on	59
Fees collected for designs	$369.50
Fines collected for infractions of Act	$300.00
Number of miles travelled by the Chief Inspector	8,400

I am pleased to report that there have been no explosions during the year.

The number of accidents to boilers and engines are fully set forth in detail in the District Inspectors' reports. The most important are as follows:—

The back-head of a return-tubular boiler was found to be cracked where the angle-iron was attached for holding one end of the lower longitudinal stays. We have had a number of similar accidents and this method of construction has been discontinued for some years past.

A very peculiar accident occurred to return-tubular boiler No. 1781A at the Duchesnay Packing Company's plant at Ladner. The boiler had only been in service ten days when it bulged directly over the furnace. The boiler was examined by Mr. Kay and myself, and when it was opened up it was comparatively clean, with the exception of a very peculiar sediment in and around the bulged part. There are indications that the boiler had been tampered with and an analysis of the deposit found is being made.

One large cast-iron boiler failed in Vancouver while hydrostatic test was being applied.

Boiler No. 1376D, one of a number built to design 1319, similar in every respect to the two that exploded, one in 1913 and one in 1914, was being subjected to special inspection by Mr. Goepel when it was discovered that the plate at the lap-seam was cracked. The boiler was considered unsafe for further service.

One of the most important installations during the year was that of five high-pressure stills that have been erected at Ioco for the Imperial Oil Company. These are for the distillation of gasolene at high pressure. The stills are 10 feet in diameter and 30 feet in length, each working at 73 lb. pressure.

The number of new boilers built for British Columbia during the year was fifty-two, as compared with 150 for 1914; seventeen of these were built in British Columbia. The five high-pressure stills were riveted up and all construction-work supervised in British Columbia,

but the sheets were formed and the holes were made in Eastern Canada. Twenty-one boilers were built in Eastern Canada and fourteen in the United States. Of these fifty-two boilers, forty-six were put into operation. The number of boilers taken out of service as unfit for further use was fifteen, as compared with fifty during the year 1914.

The number of second-hand boilers imported was thirty-five, as compared with fifty-one for the year 1914; fifteen of these were from Eastern Canada and twenty from the United States. The total number of boilers now on our books, after deducting those taken out of service, is 5,624. Of these, 2,438 received complete inspection, 184 we inspected externally only and twenty-one internally only, thus leaving 3,000 on which no inspection was made. A large number of those not inspected were not in operation during the year.

The number of plates tested for new boilers was 190, of which four were condemned as unfit for use in boiler-construction.

The cruiser "Adanac" was used in connection with inspections in Districts A and D, and for the first time all the logging camps in operation were visited. The total number of miles run was 3,500. The coal-oil used for the engine, lamps, and all other purposes was 1,177 gallons, engine-oil 31 gallons. The average consumption of coal-oil per mile for all purposes was 0.319 gallon, and the average consumption was 0.1117 gallon per horse-power per hour.

Appended you will find a summary of the total work done by all the District Inspectors, as well as their separate reports in detail.

In conclusion, I desire to thank you for your active interest and support of this office, and also wish to thank all the members of the staff for the efficient manner in which they have carried out their work during the rather trying year.

Trusting this report will meet with your approval,

I have, etc.,
JOHN PECK,
Chief Inspector.

SUMMARY OF TOTAL WORK DONE BY DISTRICT INSPECTORS IN 1915.

Number of	drawings and specifications calculated for new boilers	120
"	boiler-plates inspected	190
"	boiler-plates rejected	4
"	boilers built under inspection in British Columbia	17
"	large pressure stills built under inspection in British Columbia	5
"	boilers built under inspection in Eastern Canada	8
"	boilers built in Eastern Canada not under inspection	13
"	new boilers inspected built in United States	14
"	new boilers inspected built in British Columbia	1
"	new boilers inspected (total)	46
"	boilers imported from Eastern Canada (second-hand)	15
"	boilers imported from United States (second-hand)	20
"	boilers unclassified	25
"	first inspections	120
"	inspections, external and internal	2,367
"	internal inspections only	21
"	external inspections only	184
"	special inspections after repairs	56
"	visits in addition to inspections	1,251
"	boilers subjected to hydrostatic test	2,273
"	boilers on which pressure was reduced	44
"	boilers unsafe without extensive repairs	30
"	boilers repaired under inspector's directions	60
"	boilers considered unfit for further use	9
"	accidents to engines and boilers	8
"	accidents resulting in personal injury (not fatal)	1
"	investigations	12
"	inspections completed	2,438

SUMMARY OF TOTAL WORK DONE BY DISTRICT INSPECTORS IN 1915.—*Concluded.*

Total horse-power of boilers inspected	122,962
Number of defects observed as per summary	2,250
Number of defects considered dangerous	257
Inspection fees earned	$21,408.34
Inspection fees collected	$22,396.58
Miles travelled by the Inspector	49,229
Letters inward	6,079
Letters outward	7,675
Telegrams inward	53
Telegrams outward	55
Boilers taken out of service	15

SUMMARY OF TOTAL DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers without safety-valves	9	8
Boilers with safety-valves inoperative	1	1
Boilers with safety-valves overloaded	14	3
Boilers with safety-valves defective in construction	25	7
Pressure-gauges inoperative	17	14
Pressure-gauges defective	295	38
Cases of insufficient staying or bracing	2	1
" defective stays	28	1
" broken rivets	8	..
" defective riveting	4	1
" broken stays or braces	39	8
" loose stays or braces	11	..
Boilers damaged by low water	5	2
Defective settings	44	8
Boilers with fractured plates	47	9
" laminated plates	1	..
" burned plates	13	5
" blistered plates	7	..
Cases of sediment on fire-sheets	133	12
" internal corrosion	194	5
" scale or encrustation	187	18
" internal grooving	3	1
" external corrosion	169	5
" defective tubes	79	7
" defective feed-water arrangement	26	5
" broken feed-valves	4	..
Serious leakage around tube-ends	92	11
Serious leakage in rivet-joints	14	..
Defective blow-off pipes or cocks	126	31
Defective water-gauges	30	7
Broken blow-off pipes or cocks	6	3
Water-columns without blow-outs	4	..
Cases of broken test-cocks	194	1
Connections to water-columns without valves	10	..
Neutral sheets not stayed	4	..
Neutral sheets improperly stayed	1	..
Furnaces out of shape	1	..
Boilers without fusible plugs	34	2
Boilers low at front end	66	..
Cases of serious leakage of fittings	62	5
Number of hand-holes, doors having bolts and dogs burned off	6	2
Defects in engines	16	3

SUMMARY OF TOTAL DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Boilers without hand-holes	2	..
Boilers without stop-valves	4	..
Cases of defective steam-pipes	21	5
Unclassified defects	192	28
Totals	2,250	257

JOHN PECK,
Chief Inspector of Steam-boilers.

Report of the Chief Engineer Examiner

NEW WESTMINSTER, B.C., January 3rd, 1916.

The Honourable the Minister of Public Works,
Victoria. B.C.

SIR,—I have the honour to submit to you the following report with respect to examination of candidates for engineers' certificates for the year ending December 31st, 1915:—

During the year I have received 722 applications for examination for the different grades of certificates.

On December 31st, 1914, I had on hand 114 applications, making a total of 836. Of these, 570 have been examined; 152 applicants had their fees returned, as they had not the practical qualifications required by the Act. This leaves on the "Accepted for Examination file" 114 application forms.

RESULTS OF EXAMINATIONS.

Grade.	No. examined.	Passed.	Failed.
First	4	3	1
Second	20	3	17
Third	123	82	41
Fourth	193	141	52
Special logging-donkey	10	9	1
Special logging-locomotive	6	5	1
Special creamery	2	2	..
Special heating	70	69	1
Special road-roller	1	1	..
Temporary	141	141	..
Totals	570	456	114

Examination fees collected by Chief Inspector	$1,817 50
Fees collected by other Inspectors	137 50
Duplicate certificate fees	50 00
Total	$2,005 00

Trusting that this report will meet with your approval,

I have, etc.,
JOHN PECK,
Chief Engineer Examiner.

Senior Inspector's Report, District A.

NEW WESTMINSTER, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit to you the following report with respect to work done by me during the year ending December 31st, 1915:—

During the year my time was occupied in carrying out the varied work relating to this office—namely, examining, calculating, and registering designs of boilers, boiler accessories, pipe plans, etc., examining engineers and inspecting and testing boilers.

In addition to the above-mentioned work, I assisted you in collecting data for formulating the proposed Interprovincial Uniform Rules for the construction and inspection of boilers. I also assisted you in conducting tests on the Thomas-Mainwaring smokeless furnace, and on the steam plants at the Provincial Asylum and the Royal Columbian Hospital.

Appended you will find a list showing the number of candidates for engineers' certificates who were examined in this district during the year.

Trusting this report will meet with your approval,

I have, etc.,
JOHN DOWNIE,
Senior Inspector, District A.

RESULTS OF EXAMINATIONS.

Class.	No. examined.	Passed.	Failed.
First	4	3	1
Second	5	..	5
Third	27	19	8
Fourth	63	48	15
Temporary	22	22	..
Special logging-donkey	5	4	1
Special logging-locomotive	5	4	1
Special creamery	1	1	..
Special heating	13	13	..
Totals	145	114	31

SUMMARY OF WORK DONE IN DISTRICT A IN 1915.

Number of drawings and specifications calculated for new boilers	59
" internal inspections only	1
" external inspections only	1
" boilers subjected to hydrostatic test	1
" accidents to engines and boilers	1
" inspections completed	2
Total horse-power of boilers inspected	141
Number of defects observed as per summary	1
Number of defects considered dangerous	1
Inspection fees earned	$22.15
Inspection fees collected	$22.15
Miles travelled by the Inspector	370

SUMMARY OF DEFECTS OBSERVED.

Defects in engines, 1; dangerous, 1.

REMARKS.

In all, 117 designs were examined; fifty-eight of these were paid for, the balance (fifty-nine) being amendments. The fees collected for designs were $369.50.

JOHN DOWNIE,
Senior Inspector of Steam-boilers, District A.

Inspector's Report, District A.

NEW WESTMINSTER, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit herewith my report for the year 1915. No boiler explosions occurred during the year, and only one accident resulting in personal injury has been reported. This was due to carelessness on the part of the engineer, who stepped in front of the blow-off cock while he was blowing down the boiler.

The following are the most serious defects observed:—

Boiler No, 845 was found cracked at the lower part of the back-head, due to overheating caused by the angle-iron supporting the lower stays.

No. 1555, a small vertical boiler in a steam dye-works, was found to be much corroded on the internal surfaces. Investigation showed this to be caused by the acids being drawn from the tank to the boiler, due to the vacuum formed when steam died down in the boiler.

No. 1551, a vertical-tubular boiler, was considerably damaged on the furnace-crown and tube-ends owing to the accumulation of large amounts of scale.

Blow-down pipe of boiler No. 1655 burst during test. This pipe was found to be corroded very thin and was in a dangerous condition.

The lower part of the back-head of boiler No. 1715 was found to be considerably overheated, due to large amounts of scale in the flange curve. The seam had opened up and the rivets elongated.

The setting of boiler No. 541 was found in a dangerous condition. This setting was of stone-work originally lined with firebrick which had all fallen-out, and the mason-work was so bad that the flames from the fire came through in several places. In one place they had burned through the timber column supporting the boiler, and but for the fact that the end of the supporting beam was resting on the frame of the building the boiler would have fallen, with probably serious results.

Boiler No. 1781, which had only been in service ten days, was overheated and bulged in the centre of the course over the fire. This apparently was due to an accumulation of iron-rust and oil which had been in the boiler at the time of its installation. The cause of this accident was, however, investigated by yourself.

Boiler No. 1586, built to a design similar to the boiler which exploded in 1914, was tested at the longitudinal seams for lap cracks by cutting across the seams midway between the top of the furnace and the top of the boiler. No evidence of cracks was found.

Eight boilers owned by the Provincial Government were inspected, but no fees were collected for them, in accordance with instructions. The usual fees for these would have amounted to $66.90 and are credited to the year's earnings.

Several boilers have not been in operation this year and were not inspected; a few new enterprises, however, have just started up.

From the detailed report attached you will see that the amount of work done has been about the same as last year.

Trusting this report will meet with your approval,

I have, etc.,
JOHN D. KAY,
Inspector, District A.

REMARKS.

Assisted with some of the monthly examinations.

SUMMARY OF WORK DONE IN DISTRICT A IN 1915.

Number of boilers built in Eastern Canada not under inspection	2
" new boilers inspected built in United States	1
" new boilers inspected built in British Columbia	1
" new boilers inspected (total)	4
" boilers imported from Eastern Canada (second-hand)	1
" boilers imported from United States (second-hand)	2
" first inspections	7
" inspections, external and internal	273
" external inspections only	2
" special inspections after repairs	30
" visits in addition to inspections	139
" boilers subjected to hydrostatic test	272
" boilers on which pressure was reduced	4
" boilers unsafe without extensive repairs	7
" boilers repaired under Inspector's directions	28
" boilers considered unfit for further use	1
" accidents to engines and boilers	4
" accidents resulting in personal injury (not fatal)	1
" investigations	3
" inspections completed	274
Total horse-power of boilers inspected	11,752
Number of defects observed as per summary	406
Number of defects considered dangerous	26
Inspection fees earned	$2,153.35
Inspection fees collected	$2,095.35
Miles travelled by the Inspector	5,575
Letters inward	336
Letters outward	415
Telegrams inward	1
Boilers taken out of service	6

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Pressure-gauges defective	30	1
Cases of insufficient staying or bracing	1	1
" broken rivets	2	..
" defective riveting	1	1
" broken stays or braces	2	2
" loose stays or braces	4	..
Boilers damaged by low water	2	..
Defective settings	20	2
Boilers with fractured plates	14	2
" burned plates	2	1
" blistered plates	1	..
Cases of sediment on fire-sheets	31	..

SUMMARY OF DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Cases of internal corrosion	31	1
" scale or encrustation	33	5
" internal grooving	2	..
" external corrosion	60	3
" defective tubes	14	..
" defective feed-water arrangement	5	..
" broken feed-valves	1	..
Serious leakage around tube-ends	5	..
Serious leakage in rivet-joints	2	..
Defective blow-off pipes or cocks	17	3
Defective water-gauges	7	1
Cases of broken test-cocks	65	1
Connections to water-columns without valves	1	..
Neutral sheets not stayed	1	..
Boilers without fusible plugs	2	..
Boilers low at front end	21	..
Cases of serious leakage of fittings	3	..
Defects in engines	10	..
Cases of defective steam-pipes	2	..
Unclassified defects	14	2
Totals	406	26

JOHN D. KAY,
Inspector of Steam-boilers, District A.

Inspector's Report, District A.

NEW WESTMINSTER, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—Herewith I beg to hand you my report for 1915.

From the detailed summary you will observe the work attempted and accomplished, likewise the defects, etc., which have come under my observation. I am pleased to report that there have been no fatal accidents in the plants under my supervision.

Again I have pleasure in stating that no boiler-explosion has occurred in this District.

Examinations for engineers were held at Merritt and fully appreciated by the candidates in the Nicola District.

The work proceeding at the Imperial Oil Work, Ioco, engaged my attention.

Notwithstanding a period of comparative quiet in industrial circles, the majority of the plants in this district continue to operate.

I have endeavoured to combine efficiency of service with safety, and trust my efforts will meet with the approval of the Department.

I have, etc.,
GEORGE C. MCGOWN,
Inspector, District A.

REMARKS.

Examinations held at Merritt, and assisted in examinations held at New Westminster as occasion required.

SUMMARY OF WORK DONE IN DISTRICT A IN 1915.

Number of boilers built in Eastern Canada not under inspection	2
" boilers imported from Eastern Canada (second-hand)	4
" boilers imported from United States (second-hand)	10
" boilers unclassified	6
" first inspections	22
" inspections, external and internal	275
" internal inspections only	5
" external inspections only	10
" visits in addition to inspections	80
" boilers subjected to hydrostatic test	250
" boilers on which pressure was reduced	4
" boilers unsafe without extensive repairs	4
" boilers repaired under Inspector's direction	4
" boilers considered unfit for further use	1
" inspections completed	275
Total horse-power of boilers inspected	12,034
Number of defects observed as per summary	326
Number of defects considered dangerous	99
Inspection fees earned	$2,481.40
Inspection fees collected	$2,587.50
Miles travelled by the Inspector	9,118
Letters inward	700
Letters outward	950
Telegrams inward	1
Boilers taken out of service	3

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves defective in construction	3	1
Pressure-gauges inoperative	4	4
Pressure-gauges defective	24	10
Boilers with burned plates	1	..
Boilers with blistered plates	1	..
Cases of sediment on fire-sheets	10	5
" internal corrosion	34	4
" scale or encrustation	32	10
" external corrosion	25	1
" defective tubes	15	3
" defective feed-water arrangement	12	4
Serious leakage around tube-ends	14	5
Defective blow-off pipes or cocks	70	21
Broken blow-off pipes or cocks	2	2
Boilers without fusible plugs	2	..
Boilers low at front end	4	..
Cases of serious leakage of fittings	15	4
Cases of defective steam-pipes	4	..
Unclassified defects	54	25
Totals	326	99

REMARKS.

Inspected three boilers for Provincial Government; fees not charged and amounting to $28.90.

GEORGE C. MCGOWN,
Inspector of Steam-boilers, District A.

Inspector's Report, District A.

NEW WESTMINSTER, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit herewith my report for the year 1915.

During the year the Imperial Oil Company at Ioco has built five high-pressure and three low-pressure oil-stills. These stills are very large, the drums of the high-pressure stills being 10 feet in diameter by 30 feet long and working at a pressure of 73 lb. I inspected and tested all the plates used in the construction of these stills and inspected the stills several times during the erection and riveting, and finally all were subjected to the hydrostatic test; this, with other inspections of the Imperial Oil Company's plant, necessitated several visits thereto.

Ten new boilers were built under my supervision in the local shops. I only made a few inspections of installed steam plants this year.

My time during the year was principally taken up with office-work, examining and calculating new boiler designs, assisting at engineers' examinations, and also assisting you in several fuel-consumption tests, tests of machinery, and making data records of the same.

Trusting this report will meet with your approval,

I have, etc.,
A. S. BENNETT,
Inspector, District A.

REMARKS.

I assisted each month in the examination of engineers, and inspected and tested one boiler for the Provincial Government, for which no fees were charged.

SUMMARY OF WORK DONE IN DISTRICT A IN 1915.

Number of drawings and specifications calculated for new boilers	58
" boiler-plates inspected	162
" boiler-plates rejected	2
" new boilers built under inspection in British Columbia, including 5 large pressure stills	15
" new boilers inspected (total)	15
" boilers unclassified, low-pressure stills	2
" first inspections	17
" inspections, external and internal	25
" special inspections after repairs	1
" visits in addition to inspections	11
" boilers subjected to hydrostatic test	25
" boilers repaired under Inspector's directions	1
" inspections completed	19
Total horse-power of boilers inspected	1,147
Number of defects observed as per summary	5
Number of defects considered dangerous	2
Inspection fees earned	$244.00
Inspection fees collected	$345.40
Miles travelled by the Inspector	814
Letters inward	22
Letters outward	83

WORK DONE FOR OTHER DISTRICTS.

Nine return-tube boilers and one vertical-tube boiler were built under my supervision during the year. The final inspection of six of these boilers was made by other Inspectors and the inspection fees collected by them.

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves defective in construction	1	1
Pressure-gauges defective	1	..
Cases of defective tubes	1	..
" defective feed-water arrangement	1	..
Serious leakage around tube-ends	1	1
Totals	5	2

A. S. BENNETT,
Inspector of Steam-boilers, District A.

SUMMARY OF TOTAL WORK DONE IN DISTRICT A IN 1915

Number of drawings and specifications calculated for new boilers	117
" boiler-plates inspected	162
" boiler-plates rejected	2
" new boilers built under inspection in British Columbia	10
" new large pressure stills	5
" boilers built in Eastern Canada not under inspection	4
" new boilers inspected built in United States	1
" new boilers inspected built in British Columbia	1
" new boilers inspected (total)	19
" boilers imported from Eastern Canada (second-hand)	5
" boilers imported from United States (second-hand)	12
" boilers unclassified	8
" first inspections	46
" inspections, external and internal	573
" internal inspections only	6
" external inspections only	13
" special inspections after repairs	31
" visits in addition to inspections	230
" boilers subjected to hydrostatic test	548
" boilers on which pressure was reduced	8
" boilers unsafe without extensive repairs	11
" boilers repaired under Inspector's directions	33
" boilers considered unfit for further use	2
" accidents to engines and boilers	5
" accidents resulting in personal injury (not fatal)	1
" investigations	3
" inspections completed	570
Total horse-power of boilers inspected	25,074
Number of defects observed as per summary	738
Number of defects considered dangerous	128
Inspection fees earned	$4,900.90
Inspection fees collected	$5,050.40
Miles travelled by the Inspector	15,877
Letters inward	1,058
Letters outward	1,448
Telegrams inward	2
Boilers taken out of service	9

SUMMARY OF TOTAL DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves defective in construction	4	2
Pressure-gauges inoperative	5	4
Pressure-gauges defective	54	11
Cases of insufficient staying or bracing	1	1
Cases of broken rivets	2	..

SUMMARY OF TOTAL DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Cases of defective riveting	1	1
" broken stays or braces	2	2
" loose stays or braces	4	..
Boilers damaged by low water	2	..
Defective settings	20	2
Boilers with fractured plates	14	2
" burned plates	3	1
" blistered plates	2	..
Cases of sediment on fire-sheets	41	5
" internal corrosion	65	5
" scale or encrustation	65	15
" internal grooving	2	..
" external corrosion	85	4
" defective tubes	30	3
" defective feed-water arrangement	18	4
" broken feed-valves	1	..
Serious leakage around tube-ends	20	6
Serious leakage in rivet-joints	2	..
Defective blow-off pipes or cocks	87	24
Defective water-gauges	7	1
Broken blow-off pipes or cocks	2	2
Cases of broken test-cocks	65	1
Connections to water-columns without valves	1	..
Neutral sheets not stayed	1	..
Boilers without fusible plugs	4	..
Boilers low at front end	25	..
Cases of serious leakage of fittings	18	4
Defects in engines	11	1
Cases of defective steam-pipes	6	..
Unclassified defects	68	27
Totals	738	128

JOHN DOWNIE,
JOHN D. KAY,
GEO. C. MCGOWN,
A. S. BENNETT,
Inspectors of Steam-boilers, District A.

Senior Inspector's Report, District B.

VICTORIA, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit my report for the year 1915. This covers the general supervision of work in this office, the examination of engineers, and the inspection of steam-boilers and machinery.

During the past year examinations have been held each month in the Victoria office, every three months in Nanaimo, and at least once in the following centres: Prince Rupert, Prince George, Smithers, Vanderhoof Bednesti, Atlin, Alberni, and Cumberland. The

number of candidates for the various grades was 122, of whom eighty-nine passed and thirty-three failed to show sufficient knowledge to secure the desired certificates. The details of the various grades are appended.

During the year I have personally inspected 202 steam-boilers, made 196 hydrostatic tests, and travelled 5,601 miles. Details of those inspections are appended, and you will note that there are fewer defects and certainly fewer dangerous defects than in previous years. This shows well for the respective engineers in charge, suggesting greater vigilance in the care of their plants. I also made some 187 visits to the various boilers when under operation.

Owing to the general depression prevailing many of the steam plants have not been operated during 1915. Practically none of the brickyards operated at all; many of the logging camps remained closed, and also several of the sawmills. No accidents have been reported during the year.

I wish to express satisfaction at the efficient assistance rendered by the junior Inspectors attached to this district.

I have, etc.,
S. BAXTER,
Senior Inspector, District B.

ENGINEERS' EXAMINATIONS.

Number of applications for examinations	37
Number of applications for re-examination	8
Number of applications approved	25
Examination fees	$87.50

RESULTS OF EXAMINATIONS.

Class.	No. examined.	Passed.	Failed.
First	..	..	..
Second	5	..	5
Third	26	14	12
Fourth	57	41	16
Temporary	26	26	..
Special heating	17	17	..
Special logging-donkey	1	1	..
Totals	132	99	33

REMARKS.

Examinations have been held each month during the year in the Victoria office and tri-monthly at Nanaimo. Examinations were also held at Prince Rupert, Prince George, Smithers, Vanderhoof, Bednesti, Atlin, Alberni, and Cumberland.

SUMMARY OF WORK DONE IN DISTRICT B IN 1915.

Number of	boiler-plates inspected	8
"	boilers built under inspection in British Columbia	5
"	new boilers inspected (total)	5
"	boilers imported from United States (second-hand)	1
"	boilers unclassified	4
"	first inspections	10
"	inspections, external and internal	169
"	external inspections only	6
"	special inspections after repairs	3
"	visits in addition to inspections	187
"	boilers subjected to hydrostatic test	196
"	boilers on which pressure was reduced	5
"	boilers unsafe without extensive repairs	2
"	boilers repaired under Inspector's directions	7

SUMMARY OF WORK DONE IN DISTRICT B IN 1915.—*Concluded.*

Number of boilers considered unfit for further use	3
" accidents to engines and boilers	1
" investigations	2
" inspections completed	202
Total horse-power of boilers inspected	10,625
Number of defects observed as per summary	99
Number of defects considered dangerous	25
Inspection fees earned	$1,646.10
Inspection fees collected	$1,597.15
Miles travelled by the Inspector	5,601
Letters inward	1,922
Letters outward	2,699
Telegrams inward	17
Telegrams outward	12
Boilers taken out of service	2

WORK DONE FOR OTHER DISTRICTS.

Two boilers built under my supervision and tested for District D.

WORK DONE BY OTHER INSPECTORS FOR THIS DISTRICT.

One vertical boiler inspected and tested by District D.
One return-tube boiler inspected and tested by District A.

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Pressure-gauges inoperative	2	1
Pressure-gauges defective	17	3
Boilers damaged by low water	1	1
Defective settings	8	4
Boilers with fractured plates	1	..
" burned plates	2	2
Cases of internal corrosion	3	..
" scale or encrustation	3	..
" external corrosion	3	..
" defective tubes	1	1
Serious leakage around tube-ends	8	3
Defective blow-off pipes or cocks	3	2
Broken blow-off pipes or cocks	1	..
Cases of broken test-cocks	25	..
Boilers without fusible plugs	6	2
Boilers low at front end	3	..
Number of hand-holes, doors having bolts and dogs burned off	2	1
Defects in engines	2	2
Cases of defective steam-pipes	4	2
Unclassified defects	4	1
Totals	99	25

REMARKS.

During the past year I inspected and tested five boilers for the Provincial Government, representing 756 horse-power and $90.90 in fees; this is additional to foregoing detail.

S. BAXTER,
Inspector of Steam-boilers, District B.

Inspector's Report, District B.

VICTORIA, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit my report for the year ending December 31st, 1915.

This year shows a decrease in the total number of inspections compared with former years, due to a number of steam plants being closed down. Fifty boilers were not subjected to the hydrostatic test, owing, in most cases, to plants being temporarily closed down and fittings disconnected. The majority of the number of defects observed were not of a serious nature, and nearly all of the steam plants visited showed that they were receiving proper attention.

One return-tube boiler was discarded by the owners owing to the back-head bulging and cracking below the tubes. On examination I found this was due to an accumulation of scale between the angle-irons to which the lower stays were attached, causing the plate to be overheated. A new boiler was installed in its place.

This year I visited steam plants in nearly every district of Vancouver Island, several islands farther north, the Queen Charlotte Islands, and on the Coast of the Mainland from Smith Inlet to Granby Bay.

Trusting this report will meet with your approval,

I have, etc.,
L. DUCKITT,
Inspector, District B.

REMARKS.

During the year I assisted with examinations in Victoria, Nanaimo, Cumberland, and Prince Rupert, and also held examinations in various isolated places, details of which will be given in Mr. Baxter's report.

SUMMARY OF WORK DONE IN DISTRICT B IN 1915.

Number of boiler-plates inspected	5
" new boilers inspected built in United States	1
" new boilers inspected (total)	1
" first inspections	5
" inspections, external and internal	259
" external inspections only	13
" special inspections after repairs	1
" visits in addition to inspections	84
" boilers subjected to hydrostatic test	209
" boilers on which pressure was reduced	8
" boilers unsafe without extensive repairs	1
" boilers repaired under Inspector's directions	3
" inspections completed	275
Total horse-power of boilers inspected	15,685
Number of defects observed as per summary	138
Number of defects considered dangerous	20
Inspection fees earned	$2,416.80
Inspection fees collected	$2,455.60
Miles travelled by the Inspector	5,962

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves defective	1	1
Pressure-gauges inoperative	4	4
Pressure-gauges defective	57	..
Cases of defective stays	1	..
" broken stays or braces	4	4
" loose stays or braces	1	..
Boilers with fractured plates	4	2
" burned plates	1	..
Cases of sediment on fire-sheets	1	..
" internal corrosion	15	..
" scale or encrustation	1	..
" external corrosion	13	1
" defective tubes	9	.
" defective feed-water arrangement	1	..
Serious leakage around tube-ends	3	..
Defective blow-off pipes or cocks	5	3
Defective water-gauges	3	2
Broken blow-off pipes or cocks	1	1
Cases of broken test-cocks	1	..
Boilers without fusible plugs	2	..
Boilers low at front end	5	.
Number of hand-holes, doors having bolts and dogs burned off	1	1
Cases of defective steam-pipes	1	1
Unclassified defects	3	..
Totals	138	20

REMARKS.

I inspected two boilers for the Provincial Government; fees amounting to $10, which were not charged.

L. DUCKITT,
Inspector of Steam-boilers, District B.

Inspector's Report, District B.

VICTORIA, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit my report for the year 1915.

My work this year has taken me all over the eastern side of Vancouver Island and on the Mainland from Prince Rupert to the canneries on the Skeena River and along the Grand Trunk Pacific Railway as far east as Willow River, a post two miles east of Prince George, and besides this work I made many local inspections.

In nearly every instance the requirements of our Department were being observed in a satisfactory manner, the only slackness noticed was at some of the posts along the Grand Trunk Pacific.

With regard to the inspection of locomotive boilers, I would suggest that some means be made by which the longitudinal seam can be seen when the hydrostatic test is being applied.

Steam-users always object to removing the lagging; also I would recommend that return-tubular boilers with lap-seams be so constructed that the edge where grooving would take place can be seen from the top of the boiler.

Besides the work of inspection, I assisted with examinations in Victoria and conducted examinations in Cumberland and at many points along the Grand Trunk Pacific Railway.

Appended hereto is a tabulated list of the work done, which I trust you will find satisfactory.

I have, etc.,
JOHN CLARK,
Inspector, District B.

SUMMARY OF WORK DONE IN DISTRICT B IN 1915.

Number of boiler-plates inspected	2
" boiler-plates rejected	1
" new boilers inspected (total)	5
" boilers imported from Eastern Canada (second-hand)	5
" boilers unclassified	1
" first inspections	11
" inspections, external and internal	267
" external inspections only	14
" special inspections after repairs	6
" visits in addition to inspections	13
" boilers subjected to hydrostatic test	250
" boilers on which pressure was reduced	9
" boilers unsafe without extensive repairs	9
" boilers repaired under Inspector's directions	2
" boilers considered unfit for further use	1
" investigations	2
" inspections completed	253
Total horse-power of boilers inspected	108,087
Number of defects observed as per summary	396
Number of defects considered dangerous	17
Inspection fees earned	$2,248.80
Inspection fees collected	$2,219.70
Miles travelled by the Inspector	5,306

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers without safety-valves	1	1
Boilers with safety-valves overloaded	8	2
Boilers with safety-valves defective in construction	9	..
Pressure-gauges inoperative	4	3
Pressure-gauges defective	68	5
Cases of defective stays	11	..
" broken rivets	6	..
" defective riveting	2	..
" broken stays or braces	11	..
" loose stays or braces	5	..
Defective settings	4	..
Boilers with fractured plates	2	1
" laminated plates	1	..
" burned plates	2	..
" blistered plates	5	..
Cases of sediment on fire-sheets	23	2
" internal corrosion	36	..
" scale or encrustation	36	1
" external corrosion	30	..

SUMMARY OF DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Cases of defective tubes	23	..
" defective feed-water arrangement	1	..
" broken feed-valves	1	..
Serious leakage around tube-ends	17	..
Serious leakage in rivet-joints	11	..
Defective blow-off pipes or cocks	5	..
Defective water-gauges	3	..
Water columns without blow-outs	2	..
Cases of broken test-cocks	38	..
Boilers without fusible plugs	4	..
Boilers low at front end	15	..
Cases of serious leakage of fittings	4	..
Defects in engines	2	..
Boilers with stop-valves	1	..
Cases of defective steam-pipes	5	2
Totals	396	17

REMARKS.

Above is a tabulated list of my year's work, and enclosed is a letter with my observations upon the year's work.

JOHN CLARK,
Inspector of Steam-boilers, District B.

SUMMARY OF TOTAL WORK DONE IN DISTRICT B IN 1915.

Number of boiler-plates inspected	7
" boiler-plates rejected	1
" boilers built under inspection in British Columbia	5
" new boilers inspected built in United States	1
" new boilers inspected (total)	11
" boilers imported from Eastern Canada (second-hand)	5
" boilers imported from United States (second-hand)	1
" boilers unclassified	5
" first inspections	26
" inspections, external and internal	695
" external inspections only	33
" special inspections after repairs	10
" visits in addition to inspections	284
" boilers subjected to hydrostatic test	655
" boilers on which pressure was reduced	22
" boilers unsafe without extensive repairs	12
" boilers repaired under Inspector's directions	12
" boilers considered unfit for further use	4
" investigations	4
" inspections completed	730
Total horse-power of boilers inspected	37,118.7
Number of defects observed as per summary	633
Number of defects considered dangerous	62
Inspection fees earned	$6,311.70
Inspection fees collected	$6,272.45
Miles travelled by the Inspector	16,869
Letters inward	1,922
Letters outward	2,699
Telegrams inward	17
Telegrams outward	12
Boilers taken out of service	2

SUMMARY OF TOTAL DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers without safety-valves	2	1
Boilers with safety-valves overloaded	8	2
Boilers with safety-valves defective in construction	9	1
Pressure-gauges inoperative	10	8
Pressure-gauges defective	142	8
Cases of defective stays	12	..
" broken rivets	6	..
" defective riveting	2	..
" broken stays or braces	15	4
" of loose stays or braces	6	..
Boilers damaged by low water	1	1
Defective settings	12	4
Boilers with fractured plates	7	3
" laminated plates	1	..
" burned plates	5	2
" blistered plates	5	..
Cases of sediments on fire-sheets	24	2
" internal corrosion	54	..
" scale or encrustation	40	1
" external corrosion	46	1
" defective tubes	33	1
" defective feed-water arrangement	2	..
" broken feed-valves	1	..
Serious leakage around tube-ends	28	3
Serious leakage in rivet-joints	11	..
Defective blow-off pipes or cocks	13	5
Defective water-gauges	6	2
Broken blow-off pipes or cocks	2	1
Water-columns without blow-outs	2	..
Cases of broken test-cocks	64	..
Boilers without fusible plugs	12	2
Boilers low at front end	23	..
Cases of serious leakage of fittings	4	..
Number of hand-holes, doors having bolts and dogs burned off	3	2
Defects in engines	4	2
Boilers without stop-valves	1	..
Cases of defective steam-pipes	10	5
Unclassified defects	7	1
Totals	633	62

S. BAXTER,
L. DUCKITT,
JOHN CLARK,
Inspectors of Steam-boilers, District B.

Inspector's Report, District C.

NELSON, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit the following report for the year ending December 31st, 1915:—

Very little out of the ordinary has taken place during the year, and, with the exception of two accidents to engines, there has been very little damage to machinery, and no person has been injured by any steam plant in this district.

Two engines of similar make and size were badly damaged. In each case the strap on the connecting-rod end broke, and the cylinder, pistons, and cross-heads were smashed beyond repair. I may say that the manufacturers of these engines have altered the design, and the ones now being shipped in are of much stronger build and are giving better service. In some cases the owner of a steam plant invests in a second-hand engine which had been built for a working-pressure of 80 or 90 lb., and the boiler-pressure has to be cut down, which often destroys the efficiency of the rest of the plant.

The crown-sheets in two logging-locomotives were damaged by shortage of water. This was partly due to the steep grade and partly to the quality of the feed-water, which contained quite a lot of vegetable matter and foamed badly. Both crown-sheets were bulged between the stays, but not enough to require them being renewed.

Three return-tubular boilers were damaged by oil entering with the feed-water from an open heater and oil-separator. The damage was slight and the oil was cut off from the boilers entirely.

During the year a number of the larger sawmills were not in operation, and one of the large coal-mines was also closed. At the present time nearly all the mill-owners are busy getting out logs for next season's cut, and there is every appearance of a busier season this coming year.

Engineers' examinations were held in Princeton, Greenwood, Fernie, Cranbrook, and Nelson during the year, and these were conducted on the regular inspection trips, thereby saving some time and expense. I have found a little difficulty in getting a safe place to keep the examination papers when making inspections, and generally try to have them kept in the different Court-houses until required. There have been fewer candidates this year than usual, and I have fewer applications on file in my office than at this time last year.

There were three cases for infringement of section 35 of the "Boilers Inspection Act," and the defendants were each fined the minimum penalty.

Many of the small mines in the district are opening up, and a few of the boilers which have been in the district for many years were inspected for the first time.

Appended you will find tabulated statement for the year.

I have etc.,
ANDREW SUTHERLAND,
Inspector, District C.

RESULTS OF EXAMINATIONS.

Class.	No. examined.	Passed.	Failed.
Second	2	1	1
Third	13	12	1
Fourth	16	11	5
Temporary	4	4	..
Logging-donkey	1	1	..
Special heating	1	1	..
Totals	37	30	7

REMARKS.

Applications on hand: Second class, 5; three notified twice, two notified once. Third class, 2; not notified. Fourth class, 11; four notified twice, three notified once. Special Doukr., 3; not notified. Special logging-donkey, 1; notified twice. Special logging-locomotive, 1; notified once.

SUMMARY OF WORK DONE IN DISTRICT C IN 1915.

Number of boilers built in Eastern Canada not under inspection	4
" new boilers inspected built in United States	2
" boilers imported from Eastern Canada (second-hand)	5
" boilers imported from United States (second-hand)	4
" first inspection	15
" inspection, external and internal	241
" internal inspection only	1
" external inspection only	1
" special inspection after repairs	2
" visits in addition to inspections	140
" boilers subjected to hydrostatic test	231
" boilers on which pressure was reduced	4
" boilers unsafe without extensive repairs	2
" boilers repaired under Inspector's directions	8
" boilers considered unfit for further use	2
" accidents to engines and boilers	1
" investigations	2
" inspections completed	241
Total horse-power of boilers inspected	15,063
Number of defects observed as per summary	233
Number of defects considered dangerous	9
Inspection fees earned	$2,285.05
Inspection fees collected	$2,348.60
Miles travelled by the Inspector	6,311
Letters inward	295
Letters outward	332
Telegrams inward	19
Telegrams outward	23
Boilers taken out of service	2

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves overloaded	1	..
Boilers with safety-valves defective in construction	2	1
Pressure-gauges inoperative	1	1
Pressure-gauges defective	27	..
Cases of insufficient staying or bracing	1	..
" defective stays	4	..
" broken stays or braces	5	2
" loose stays or braces	1	..
Boilers damaged by low water	1	..
Defective settings	8	..
Boilers with fractured plates	4	1
" burned plates	2	1
Cases of sediment on fire-sheets	29	1
" internal corrosion	2	..
" scale or encrustation	36	..
" external corrosion	15	..
" defective tubes	9	..
" defective feed-water arrangement	1	..

SUMMARY OF DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Serious leakage around tube ends	5	1
Defective blow-off pipes or cocks	2	..
Defective water-gauges	3	1
Cases of broken test-cocks	32	..
Connections to water-columns without valves	2	..
Neutral sheets not stayed	2	..
Neutral sheets improperly stayed	1	..
Furnaces out of shape	1	..
Boilers without fusible plugs	9	..
Boilers low at front end	16	..
Cases of serious leakage of fittings	3	..
Defects in engines	1	..
Boilers without hand-holes	2	..
Boilers without stop-valves	2	..
Cases of defective steam-pipes	2	..
Unclassified defects	1	..
Totals	233	9

REMARKS.

Fines amounting to $300 were collected during the year and forwarded to the head office of this Department.

ANDREW SUTHERLAND,
Inspector of Steam-boilers, District C.

Senior Inspector's Report, District D.

VANCOUVER, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit the following report for 1915 (*see* tabulated report):—

During the first five months of the year I was absent on sick leave, from which I am thankful to say I have derived considerable benefit, and I wish to take this opportunity to thank both yourself and the individual members of the staff for their kindness during my illness.

Only one accident was reported to this office during the year. The piston-rod on the engine in the Royal Ice Company's plant worked loose in the cross-head, and finally stripped the thread in cast-iron cross-head and punched out the cylinder-head, doing no further damage, however.

We have instituted no prosecutions for infractions of the "Boilers Inspection Act" during the year, and only one engineer's certificate was dealt with for negligence, and this was returned to him later on.

There has been a marked reduction in the number of plants requiring inspection this year owing to abnormal conditions existing, but the prospects for improvement during the coming year are much brighter and trust they will be fulfilled.

All of the above is respectfully submitted.

I have etc.,
GEO. O. MADIGAN,
Senior Inspector, District D.

RESULTS OF EXAMINATIONS.

Class.	No. examined.	Passed.	Failed.
Second	8	2	6
Third	52	34	18
Fourth	43	30	13
Temporary	62	62	..
Special heating	34	33	1
Special logging-donkey	6	6	..
Totals	205	167	38

SUMMARY OF WORK DONE IN DISTRICT D IN 1915.

Inspection fees collected	$7,595.38
Letters inward	2,227
Letters outward	2,662
Telegrams inward	2
Telegrams outward	7

GEORGE O. MADIGAN,
Inspector of Steam-boilers, District D.

Inspector's Report, District D.

VANCOUVER, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit herewith my report for the year 1915.

During January, February, March, April, May, and part of June my time was occupied with examinations, office-work, etc., in the absence of Mr. Madigan, who was away on sick leave. The balance of the year was taken up with the usual routine of boiler inspection, which, with the following exceptions, did not develop anything of a special interest.

A large cast-iron boiler under hydrostatic test of 20 lb. cracked badly across one section.

A Chinaman was found operating the boiler at the Wonder Coffee House, while the man who held a temporary certificate for same was operating a jitney. His certificate was taken down and sent to your office for action upon the same.

Engine connected to boiler No. 1766D was found operating with several cracks in the frame, and was considered quite dangerous enough to be immediately shut down.

In February I visited and carried out test upon boiler No. 1376D at Seaside Park. This boiler was one of the series built to design No. 1319, and had been allowed a working-pressure of 145 lb. per square inch. The boiler had just been sold by the Bank of Vancouver to Newson, Keen, & Townley, and as the records showed a very large deflection when inspection was made by Mr. Bath, I decided it would be advisable to carry out another test. This test was applied along the lines suggested by Mr. S. F. Jeter, Chief Engineer of the Hartford Boiler Inspection, and consisted of cutting a channel about 2 inches long, $\frac{1}{4}$ inch wide, and 9/32 inch deep (half depth of shell-plate) across the point where the lap crack would be expected to take place. At 8/32 inch deep on one side the plate was found fractured, and at 9/32 inch deep and a test pressure of 180 lb. a large stream escaped. In fact, water began to ooze out at once when the crack was first observed. The deflection tests on the seams of this boiler showed to be about 67/1,000. It is needless to say that this test convinced those who were present that the boiler was unsafe to operate, and the ocular demonstration of water coming out of a boiler with the plate half cut through was thorough enough even for the most sceptical person to have any doubt about. I have ordered several boilers since that time to be cut in this manner, so that should a crack develop it will be noticed in time and may effect a saving in life and prevent damage to property. Trusting this report will be satisfactory,

I have, etc.,
PERCY A. GOEPEL,
Inspector, District D.

SUMMARY OF WORK DONE IN DISTRICT D IN 1915.

Number of boilers built under inspection in Eastern Canada	4
" boilers built in Eastern Canada not under inspection	1
" new boilers inspected (total)	5
" boilers unclassified (superheaters)	12
" first inspections	17
" inspections, external and internal	218
" internal inspections only	2
" external inspections only	4
" special inspections after repairs	10
" visits in addition to inspections	355
" boilers subjected to hydrostatic test	169
" boilers on which pressure was reduced	2
" boilers unsafe without extensive repairs	3
" boilers repaired under Inspector's directions	5
" boilers considered unfit for further use	1
" investigations	1
" inspections completed	218
Total horse-power of boilers inspected	9,667.63
Number of defects observed as per summary	171
Number of defects considered dangerous	32
Inspection fees earned	$1,742.84
Inspection fees collected	$1,805.43
Miles travelled by the Inspector	2,050

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves defective in construction	1	..
Pressure-gauges defective	34	10
Boilers damaged by low water	1	1
Defective settings	3	2
Boilers with fractured plates	4	3
Cases of sediment on fire-sheets	34	4
" internal corrosion	2	..
" scale or encrustation	23	2
" internal grooving	1	1
" external corrosion	12	..
" defective tubes	5	3
" defective feed-water arrangement	1	1
Serious leakage around tube-ends	3	1
Defective blow-off pipes or cocks	3	2
Defective water-gauges	7	1
Water-columns without blow-outs	2	..
Cases of broken test-cocks	2	..
Boilers without fusible plugs	1	..
Cases of serious leakage of fittings	32	1
Totals	171	32

PERCY A. GOEPEL,
Inspector of Steam-boilers, District D.

Inspector's Report, District D.

VANCOUVER, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to forward you my report of work done during the past year.

During the greater part of the year I have been employed outside the Vancouver City limits, inspecting logging camp, cannery, and mining plants; the number of separate plants on which complete inspection was made being 102. A large number of plants was also visited, but not inspected, owing to their owners informing me that they did not intend operating during the ensuing twelve months.

The launch "Adanac" was used for the greater part of this work, the distance run being 2,592 miles (geographical miles) and the time taken being five months. The engine of the launch ran on the whole very satisfactorily, but there were indications that the engine requires a thorough overhaul. I am pleased to state that Mr. Miller's work during the time he was operating the launch was very satisfactory.

During the course of this work I found that the provisions of the Act were being fairly well observed. One thing which impressed me whilst inspecting log-haul boilers was the ability of circular furnaces to retain their shape in spite of, in some cases, a large number of broken furnace-stays.

The amount of work accomplished by me this year was somewhat less than that of last year, but this state of things was caused by conditions over which I had no control.

Hoping that conditions in 1916 will be an improvement over those of the past year,

I have, etc.,
FREDERICK BATH,
Inspector, District D.

SUMMARY OF WORK DONE IN DISTRICT D IN 1915.

Number of boiler-plates inspected	2
" boilers built under inspection in British Columbia	1
" boilers built under inspection in Eastern Canada	3
" new boilers inspected built in United States	1
" new boilers inspected (total)	3
" first inspections	5
" inspections, external and internal	312
" external inspections only	10
" special inspections after repairs	1
" visits in addition to inspections	47
" boilers subjected to hydrostatic test	282
" boilers on which pressure was reduced	6
" boilers unsafe without extensive repairs	1
" inspections completed	312
Total horse-power of boilers inspected	11,012
Number of defects observed as per summary	148
Number of defects considered dangerous	1
Inspection fees earned	$2,313.60
Inspection fees collected	$2,948.90
Miles travelled by the Inspector	3,999

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves overloaded	5	1
Boilers with safety-valves defective in construction	6	..
Pressure-gauges defective	21	..
Cases of broken stays or braces	14	..
Boilers with fractured plates	13	..
Boilers with burned plates	1	..
Cases of sediment on fire-sheets	4	..
" internal corrosion	7	..
" external corrosion	8	..
" defective tubes	2	..
" broken feed-valves	2	..
Serious leakage around tube-ends	30	..
Serious leakage in rivet-joints	1	..
Defective blow-off pipes or cocks	14	..
Defective water-gauges	1	..
Broken blow-off pipes or cocks	2	..
Cases of broken test-cocks	11	..
Boilers without fusible plugs	1	..
Cases of serious leakage of fittings	2	..
Boilers without stop-valves	1	..
Unclassified defects	2	..
Totals	148	1

REMARKS.

Extra fees earned through special inspection, $8.50.

FREDERICK BATH,
Inspector of Steam-boilers, District D.

Inspector's Report, District D.

VANCOUVER, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—Appended hereto please find my annual report detailing the work done during 1915.

I may say that work has been, in the main, routine; nothing deserving of special remark being met with in the course of the year.

It will be noticed that the volume of work compares favourably with last year, which is very satisfactory considering the economic conditions of the times.

Hoping this report will have your approval,

I have etc.,
FREDERICK BIGGAM,
Inspector District D.

SUMMARY OF WORK DONE IN DISTRICT D IN 1915.

Number of boiler-plates inspected	19
" boiler-plates rejected	1
" boilers built under inspection in British Columbia	1
" boilers built under inspection in Eastern Canada	1
" new boilers inspected built in United States	6
" new boilers inspected built in British Columbia	1
" new boilers inspected (total)	8
" boilers imported from United States (second-hand)	3
" first inspections	11
" inspections, external and internal	180
" internal inspections only	12
" external inspections only	123
" special inspections after repairs	2
" visits in addition to inspections	195
" boilers subjected to hydrostatic test	260
" boilers on which pressure was reduced	1
" boilers unsafe without extensive repairs	1
" boilers repaired under Inspector's directions	2
" accidents to engines and boilers	2
" investigations	2
" inspections completed	312
Total horse-power of boilers inspected	18,886.25
Number of defects observed as per summary	254
Number of defects considered dangerous	22
Inspection fees earned	$2,685.85
Inspection fees collected	$2,841.05
Miles travelled by the Inspector	1,745

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves small in area	6	6
Boilers with safety-valves inoperative	1	1
Boilers with safety-valves defective in construction	3	3
Pressure-gauges inoperative	1	1
Pressure-gauges defective	9	9
Cases of defective stays	12	1
" defective riveting	1	..
" broken stays or braces	2	..
Boilers damaged by oil	1	..
Defective settings	1	..
Boilers with fractured plates	4	..
Boilers with burned plates	1	1
Cases of internal corrosion	59	..
" scale or encrustation	23	..
" external corrosion	3	..
" defective feed-water arrangement	4	..
Serious leakage around tube-ends	6	..
Defective blow-off pipes or cocks	6	..
Cases of broken test-cocks	19	..
Boilers low at front end	2	..
Cases of serious leakage of fittings	2	..
Number of hand-holes, doors having bolts and dogs burned off	3	..
Cases of defective steam-pipes	2	..
Unclassified defects	83	..
Totals	254	22

FREDERICK BIGGAM,
Inspector of Steam-boilers, District D.

SUMMARY OF TOTAL WORK DONE IN DISTRICT D IN 1915.

Number of boiler-plates inspected	21
" boiler-plates rejected	1
" boilers built under inspection in British Columbia	2
" boilers built under inspection in Eastern Canada	8
" boilers built in Eastern Canada not under inspection	1
" new boilers inspected built in United States	7
" new boilers inspected built in British Columbia	1
" new boilers inspected (total)	16
" boilers imported from United States (second-hand)	3
" boilers unclassified	12
" first inspections	33
" inspections, external and internal	710
" internal inspections only	14
" external inspections only	137
" special inspections after repairs	13
" visits in addition to inspections	597
" boilers subjected to hydrostatic test	711
" boilers on which pressure was reduced	9
" boilers unsafe without extensive repairs	5
" boilers repaired under Inspector's directions	7
" boilers considered unfit for further use	1
" accidents to engines and boilers	2
" investigations	3
" inspections completed	842
Total horse-power of boilers inspected	39,565.88
Number of defects observed as per summary	573
Number of defects considered dangerous	55
Inspection fees earned	$6,742.29
Inspection fees collected	$7,595.38
Miles travelled by the Inspector	7,794
Letters inward	2,227
Letters outward	2,662
Telegrams inward	2
Telegrams outward	7

SUMMARY OF TOTAL DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers with safety-valves small in area	6	6
Boilers with safety-valves inoperative	1	1
Boilers with safety-valves overloaded	5	1
Boilers with safety-valves defective in construction	10	3
Pressure-gauges inoperative	1	1
Pressure gauges defective	64	19
Cases of defective stays	12	1
" defective riveting	1	..
" broken stays or braces	16	..
Boilers damaged by low water	1	1
Defective settings	4	2
Boilers with fractured plates	21	3
Boilers with burned plates	3	1
Cases of sediment on fire-sheets	38	4
" internal corrosion	68	..
" scale or encrustation	46	2
" internal grooving	1	1
" external corrosion	23	..
" defective tubes	7	3

SUMMARY OF TOTAL DEFECTS OBSERVED.—*Concluded.*

Nature of Defects.	Number.	Dangerous.
Cases of defective feed-water arrangement	5	1
Cases of broken feed-valves	2	..
Serious leakage around tube-ends	39	1
Serious leakage in rivet-joints	1	..
Defective blow-off pipes or cocks	23	2
Defective water-gauges	8	1
Broken blow-off pipes or cocks	2	..
Water-columns without blow-outs	2	..
Cases of broken test-cocks	32	..
Boilers without fusible plugs	2	..
Boilers low at front end	2	..
Cases of serious leakage of fittings	36	1
Number of hand-holes, doors having bolts and dogs burned-off	3	..
Boilers without stop-valves	1	..
Cases of defective steam-pipes	2	..
Unclassified defects	85	..
Totals	573	55

GEO. O. MADIGAN,
PERCY A. GOEPEL,
F. BATH,
F. BIGGAM,
Inspectors of Steam-boilers, District D.

Inspector's Report, District E.

REVELSTOKE, B.C., January 3rd, 1916.

John Peck, Esq.,
Chief Inspector of Machinery, New Westminster, B.C.

SIR,—I have the honour to submit my annual report for the year 1915.

I regret that the plants operated during the year were less than my estimate made in January, 1915. So far as I know, I have inspected all boilers in use, with the exception of those in the Cariboo District. My information regarding these is that very few are in use, and they only for a short period, and as the trip is an expensive one, I left them over this year.

An evaporating company has installed plants in Armstrong, Vernon, and Kelowna, where vegetables are desiccated and shipped to the War Department.

The heating plants cause more trouble than the high-pressure plants, but the plumbing firms are becoming more familiar with the regulations, so that it is now only the old boilers which have to be brought up to the requirements.

While the year has been a bad one, there is a better prospect in the lumber industry this year according to reports from the lumbermen.

At the examinations held for engineers' certificates very few of the candidates appeared, many having gone to the war or to make munitions.

Appended you will find a tabulated list of work done and defects observed.

Trusting this report may be found satisfactory under the circumstances,

I have, etc.,
H. WORTH,
Inspector, District E.

ENGINEERS' EXAMINATIONS.

Examination fees, $50.

RESULTS OF EXAMINATIONS.

Class.	No. examined.	Passed.	Failed.
Third	5	3	2
Fourth	14	11	3
Temporary	27	27	..
Special heating	5	5	..
Totals	51	46	5

REMARKS.

Examinations held at Revelstoke, Vernon, Kamloops, Enderby, and Golden.

SUMMARY OF WORK DONE IN DISTRICT E IN 1915.

Number of drawings and specifications calculated for new boilers	3
" " " " old boilers	3
" boilers built in Eastern Canada not under inspection	4
" new boilers inspected built in United States	3
" inspections, external and internal	148
" boilers subjected to hydrostatic test	128
" boilers on which pressure was reduced	1
" inspections completed	155
Total horse-power of boilers inspected	6,140.4
Number of defects observed as per summary	73
Number of defects considered dangerous	3
Inspection fees earned	$1,168.40
Inspection fees collected	$1,129.75
Examination fees	$50.00
Miles travelled by the Inspector	2,378
Letters inward	577
Letters outward	534
Telegrams inward	13
Telegrams outward	13
Boilers taken out of service	2

SUMMARY OF DEFECTS OBSERVED.

Nature of Defects.	Number.	Dangerous.
Boilers without safety-valves	1	1
Pressure-gauges defective	8	..
Cases of broken stays or braces	1	..
Boilers with fractured plates	1	..
Cases of sediment on fire-sheets	1	..
Cases of internal corrosion	5	..
Defective blow-off pipes or cocks	1	..
Defective water-gauges	6	2
Cases of broken test-cocks	1	..
Connections to water-columns without valves	7	..
Neutral sheets not stayed	1	..
Boilers without fusible plugs	7	..
Cases of serious leakage of fittings	1	..
Cases of defective steam-pipes	1	..
Unclassified defects	31	..
Totals	73	3

REMARKS.

One fire-engine boiler was condemned, being very old and worn out.

One boiler was taken out of use by the owner, as he stated that he knew it was in poor shape and he did not think it worth while to remove covering, etc., for thorough inspection.

A Merryweather boiler in a pool-room had no safety-valve.

Two gauge-glass fittings were dangerously low on locomotive type boilers.

There was one case of cracked back-head through angle-bar construction to secure stays, and one case of a broken main stay.

H. WORTH,
Inspector of Steam-boilers, District E.

LIST OF REGISTERED DESIGNS.

LIST OF BOILER MANUFACTURERS, WITH THEIR NUMBER OF APPROVED AND REGISTERED DESIGNS.

Alley & MacLellan, Glasgow, Scotland	1
Allbright Nell Co., Chicago, Ill., U.S.A.	1
American Radiator Co. of Canada, Toronto, Ont.	25
American Hoist & Derrick Co., St. Paul, Minn., U.S.A.	26
American Locomotive Co., New York, U.S.A.	6
Ames Iron Works, Oswego, N.Y., U.S.A.	5
Atlas Engine Works, Indianapolis, U.S.A.	1
Averling & Porter, Ltd., Rochester, Eng.	1
Avery Co., Peoria, Ill., U.S.A.	2
Babcock & Wilcox, Renfrew, Scotland	19
Baldwin Locomotive Works, Philadelphia, U.S.A.	18
B.C. Marine Railway Co., Vancouver and Victoria, B.C.	4
Beatty, M., & Sons, Ltd., Welland, Ont.	11
Berg Machinery Manufacturing Co., Toronto, Ont.	1
Bell, Robert, Engine & Threshing Co., Ltd., Seaforth, Ont.	5
Bros, William, Minneapolis, U.S.A.	7
Brown Hoisting Co., Cleveland, Ohio., U.S.A.	2
Brownell, The, Co., Dayton, Ohio, U.S.A.	3
Browning Engineering Co., Cleveland, Ohio, U.S.A.	1
Bucyrus Co., South Milwaukee, U.S.A.	20
Buffalo Steam Roller Co., Buffalo, New York, U.S.A.	1
Canadian Allis-Chalmers, Ltd., Toronto, Ont.	1
Canada Foundry Co., Toronto, Ont	22
Canada Iron Corporation, Ltd., Midland, Ont.	6
Canadian Talbot Boiler Co., Vancouver, B.C.	1
Case, J. I., Threshing Co., Racine, Wis., U.S.A.	22
Casey, Hedges Co., Ltd, Chattanooga, Tenn., U.S.A.	1
Canadian Locomotive Co., Kingston, Ont.	5
Clyde Iron Works, Duluth, Minn., U.S.A.	9
Climax Manufacturing Co., Corry, Pa., U.S.A.	5
Clayton, Son & Co., Leeds, England	1
Columbiana Boiler Works Co., Columbiana, Ohio, U.S.A.	4
Continental Iron Works, New York, U.S.A.	1
Cochrane & Co., Annan, Scotland	1
Davenport Locomotive Works, Davenport, Iowa, U.S.A.	13
Decarie Safety Boiler Co., Vancouver, B.C.	4
Diamond Boiler Works, Minneapolis, U.S.A.	1
Doty Engine Works, Goderich, Ont	6
Dutton Co., C.H., Kalamazoo, Mich., U.S.A.	7
Empire Manufacturing Co., Ltd., Vancouver, B.C.	9
Erie City Iron Works, Erie, Pa., U.S.A.	4
Farquhar Co., A. B., York, Penn., U.S.A.	7
Foden, Ltd., Sandback, England	2
Frost Manufacturing Co., Galesburgh, Ill., U.S.A	36
Gaar, Scott & Co., Richmond, Ind., U.S.A.	1
Gem City Boiler Works, Dayton, Ohio, U.S.A	1
Georgian Bay Engine Works, Midland, Ont.	1
Goldie, McCulloch Co., Galt, Ont.	47
Grand Trunk Pacific Railway Co	2
Gray, Andrew, Marine Iron Works, Victoria, B.C.	8
Great Northern Railway, Winnipeg, Man	1
Gurney Foundry Co., Ltd., Toronto, Ont.	11
Hamilton Manufacturing Co., Wm., Peterboro, Ont.	1
Heisler Locomotive Works, Erie, Pa., U.S.A.	7
Holt Manufacturing Co., Stockton, Cal., U.S.A.	2
Houston, Stanwood & Gamble, Cincinnati, Ohio, U.S.A.	1
International Engineering Works, Amherst, N.S.	32
Inglis Co., Jno., Toronto, Ont	6
Industrial Works, Bay City, Mich., U.S.A.	2
Jenckes Machine Co., Ltd., St. Catharines, Ont	93
Keeler, E., Co., Williamsport, Pa., U.S.A.	1
Kelly Springfield Road Roller Co., Springfield, Ohio, U.S.A.	1
Kewanee Boiler Co., Kewanee, Ill., U.S.A.	15

LIST OF REGISTERED DESIGNS.—*Concluded.*

Keystone Driller Co., Beaver Falls, Pa., U.S.A.	2
Leonard & Sons, E., London, Ont.	36
Leffell & Co., James, Springfied, Ohio, U.S.A	1
Lidgerwood Manufacturing Co., Brooklyn, N.Y., U.S.A	4
Lima Locomotive & Machine Co., Lima, Ohio, U.S.A.	20
Lyons Boiler Works, DePere, Wis., U.S.A.	2
Manitowic Iron Works, Manitowic, Wis., U.S.A.	2
Mann's Patent Steam Cart & Wagon Co., Leeds, England	3
Marine Iron Works, Victoria, B.C.	8
Marion Steam Shovel Co., Marion, Ohio, U.S.A.	35
Marion Osgood Co., Marion, Ohio, U.S.A.	5
Marsh & Henthorn, Belleville, Ont.	10
Matheson & Co., J., Ltd., New Glasgow, N.S.	10
Marshall & Sons Co., Ltd., Gainsborough, England	1
Mainland Iron Works, Vancouver, B.C.	1
Macdougall Co., John, Caledonian Iron Works, Montreal, Que.	3
Montreal Locomotive Works, Montreal, Que.	9
Nagle Engine & Boiler Works, Erie, Pa., U.S.A.	1
Nicol Boiler Works, Vancouver, B.C.	2
Napanee Iron Works, Napanee, Ont.	1
North Shore Iron Works, North Vancouver, B.C.	41
Oil City Boiler Works, Oil City, Pa., U.S.A.	1
Orr & Sembower, Reading, Pa., U.S.A.	19
Pennsylvania Boiler Works, Erie, Pa., U.S.A.	3
Porter Co., H. K., Pittsburg, Pa., U.S.A.	10
Polson Iron Works, Toronto, Ont.	1
Puget Sound Iron & Steel Works, Tacoma, Wash., U.S.A.	2
Risdon Locomotive & Iron Co., San Francisco, U.S.A.	1
Robey & Co., Lincoln, England	2
Ross & Howard Iron Works, Ltd., Vancouver, B.C.	31
Ruston, Proctor Co., Lincoln, England.	7
Sawyer, Massey Co., Ltd., Hamilton, Ont.	15
Standard Iron Works, Vancouver, B.C.	1
Sterns Co., Erie, Pa., U.S.A.	1
Sumner Iron Works, Everett, Wash., U.S.A.	1
Swift & Co., Chicago, Ill., U.S.A.	1
Taylor, Forbes & Co., Ltd., Vancouver, B.C.	30
Thew Automatic Shovel Co., Lorraine, Ohio, U.S.A	5
Toronto Iron Works, Ltd., Toronto, Ont.	1
Twohy Bros. Co., Portland, Ore., U.S.A.	1
Union Iron Works, Erie, Pa., U.S.A.	30
Vancouver Engineering Works, Vancouver, B.C.	64
Victoria Machinery Depot Co., Victoria, B.C.	32
Vulcan Iron Works, New Westminster, B.C.	33
Vulcan Iron Works, Seattle, Wash., U.S.A.	1
Vulcan Iron Works, Wilkes-Barre, Pa., U.S.A.	1
Waterous Engine Works, Brantford, Ont.	61
Washington Iron Works, Seattle, Wash., U.S.A.	32
Western Dry Dock & Shipbuilding Co., Ltd., Port Arthur, Ont.	1
Wickes Boiler Co., Saginaw, Mich., U.S.A.	3
Williamette Iron & Steel Works, Portland, Ore., U.S.A.	1

LIST OF MAKERS WHO HAVE REGISTERED AND APPROVED BOILER ACCESSORY DESIGNS.

Spring Safety-valves.

	6 in.	5 in.	4½ in.	4 in.	3½ in.	3 in.	2½ in.	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
American Steam Gauge & Valve Co., Boston, Mass., U.S.A.	1	1	1	1	2	2	5	5	3	3	2	2	..
Ashton Valve Co., Boston, Mass., U.S.A.	..	..	..	3	..	..	1	..	..	..	..	..	..
Consolidated Safety Valve Co., New York, U.S.A.	..	..	..	1	..	4	1	1	1	..	..	..	..
Crane Co., Chicago, Ill., U.S.A.	1	1	1	2	1	2	2	2	2	2	3	2	2
Crosby Steam Gauge & Valve Co., Chicago, Ill., U.S.A.	..	..	..	..	..	2	3	1	1	..	..	..	..
E. Leonard & Sons, London, Ont.	..	..	..	..	..	1	1	1	1	..	..	..	..
J. E. Lonergan & Co., Philadelphia, Pa., U.S.A.	..	..	..	..	..	1	1	2	2	1	1	..	..
James Morrison Brass Manufacturing Co., Ltd., Toronto, Ont.	..	..	..	..	..	..	1	..	..	..	..	..	..
Lunkenheimer Co., Cincinnati, U.S.A.	..	1	1	3	3	6	4	4	1	1	1	1	1
T. McAvity & Sons, St. John, N.B.	..	..	..	1	..	1	1	7	1	1	1	..	..
Ruston Proctor & Co., Ltd., Lincoln, England.	..	..	..	..	..	..	..	..	1	..	..	..	..
International Engineering Works, Amherst, N.S.	..	..	..	..	..	1	..	..	..	..	..	..	..
Waterous Engine Works, Ltd., Brantford, Ont.	..	..	..	..	..	1	..	..	..	..	..	..	..

Main Stop-valves.

American Locomotive Co., New York, U.S.A.	3
Canadian Locomotive Co., Ltd., Kingston, Ont.	3
Crane Co., Chicago, Ill., U.S.A.	3
G. M. Davis Regulator Co., Chicago, Ill., U.S.A.	1
Jenkins Bros., Ltd., Montreal, Que.	11
Lunkenheimer Co., Cincinnati, U.S.A.	2
Montreal Locomotive Works, Ltd., Montreal, Que	3
Penberthy Injector Co., Ltd., Windsor, Ont.	2

Steam-gauges.

Ashcroft Manufacturing Co., New York, U.S.A.	5
United States Gauge Co., New York, U.S.A.	2

Blow-off Cocks and Valves.

American Locomotive Co., New York, U.S.A.	1
Crane Co., Chicago, Ill., U.S.A.	3
Engineering Specialties Co., Toronto, Ont.	4
Jenkins Bros., Ltd., Montreal, Que.	3
Lunkenheimer Co., Cincinnati, Ohio, U.S.A.	2
Montreal Locomotive Works, Montreal, Que.	1

Safety Apparatus.

Kilkenney Automatic safety Appliance Co., Walla Walla, Wash, U.S.A	1

Water-gauge Fittings.

American Locomotive Co., New York, U.S.A.	1
Jenkins Bros., Ltd., Montreal, Que.	1
McAvity & Sons, T., St. John, N.B.	1
Canadian Locomotive Co., Kingston, Ont.	1
James Morrison Brass Manufacturing Co., Ltd., Toronto, Ont.	2
Montreal Locomotive Works, Montreal, Que.	1
Penberthy Injector Co., Ltd., Windsor, Ont.	4

Test-cocks (or Valves).

American Locomotive Co., New York, U.S.A.	1
Canadian Locomotive Co., Kingston, Ont.	1
J. I. Case Threshing Machine Co., Racine, Wis., U.S.A.	1
Montreal Locomotive Works, Montreal, Que.	1
James Morrison Brass Manufacturing Co., Ltd., Toronto, Ont.	2
T. McAvity & Sons, St. John, N.B.	1
Penberthy Injector Co., Ltd., Windsor, Ont.	2

Superheaters.

Power Specialty Co., New York, U.S.A.	3

Economizers.

B. F. Sturtevant Co., Boston, Mass., U.S.A.	1

ENGINEERS WHO OBTAINED CERTIFICATES IN 1915.

FIRST CLASS.

Calderhead, J. A.	10,203	Wrighson, F. G.	9,912
Smith, A. J.	10,101		

SECOND CLASS.

Keller, E. H.	9,948	Turnbull, Archibald	9,924
Rae, John	9,864		

THIRD CLASS.

Adair, S. J.	9,759	Miles, F. J.	9,934
Ades, H. R.	9,998	Motram, J. A.	10,184
Atkinson, Charles	10,017	Muir, J. S.	9,862
Atkinson, Herbert	10,197	Macdonald, John	10,115
Becker, Frederick	10,199	McGary, D. V.	10,070
Blair, J. D.	10,182	McIntosh, Richard	9,951
Boyd, L. G.	9,980	McIlroy, V. P.	10,227
Brewer, W. C.	9,743	McKenzie, G. A.	9,718
Bradshaw, Nathaniel	9,762	MacKenzie, L. A.	10,008
Brown, Isaac	9,857	McKinnon, John	10,116
Cameron, A. A.	10,166	McMillan, J. P.	9,719
Crockett, V. V.	10,205	Netherton, William	9,751
Curnew, Arthur	9,933	Nicholl, Samuel	10,147
Daykin, A. K.	9,712	Nicholl, John	10,148
Dayton, H. F.	9,713	O'Brien, H. E.	10,045
Dick, Joseph	9,764	Olds, W. J.	9,889
Dolstra, John	9,859	Osborn, E. A.	9,971
Eastwood, J. M.	9,692	Parsons, R. C.	9,993
Foulkes, Ishmael	9,710	Paulson, J. P.	10,010
Forsyth, David	10,141	Park, William	10,250
Gill, E. E.	10,210	Pennycook, W. H.	9,720
Greenius, R. O.	10,211	Pearce, E. J.	9,923
Hamilton, G. A.	9,768	Pearl, W. S.	10,046
Harold, T. A.	9,816	Quissy, S. N.	9,902
Harris, P. E.	9,826	Ramsden, H. A.	10,117
Handley, O. H.	9,918	Rhodes, J. W.	10,028
Harton, B. S.	9,945	Richardson, Ernest	10,013
Hill, E. R.	9,693	Russell, F. A.	9,776
Hunt, F. L.	10,179	Smith, C. F.	9,865
Irwin, W. J.	10,216	Smith, W. J. R.	10,014
Johnson, W. G.	9,845	Spooner, F. W.	10,234
Lamb, A. L.	9,846	Svendson, Martin	9,698
Larmer, I. H.	9,949	Symms, R. T.	10,236
Lawrence, R. S.	10,039	Thomas, W. S.	9,891
Linde, P. E.	9,985	Toombs, T. A.	10,071
Lynn, Emal	9,950	Turnbull, John	9,821
Mair, W. H.	9,818	Vint, Peter	10,118
Mason, J. A.	9,920	Walker, W. J.	9,808
Mark, J. J.	10,222	Walton, George	9,848
Marsh, Joseph	10,249	Webster, Frederick	9,925
Miles, C. W.	9,716	Wells, William	10,239

FOURTH CLASS.

Abear, O. P.	9,867	Becker, C. F.	10,065
Alexander, James	9,954	Blair, J D.	10,076
Baillie, J. H.	9,812	Boyce, Frank	10,200
Batterson, F. E.	9,813	Braithwaite, C. G.	10,072
Barr, Malcolm	10,198	Bray, Joe	10,129
Bell, F. A.	9,787	Brown, W. A.	10,165
Bell, Leonard	9,825	Brand, F. W.	10,202
Bean, J. S.	9,856	Burge, A. R.	9,858
Beaton, D. N.	9,903	Buker, C. R.	9,899
Bell, A. W.	9,968	Byers, J. J.	10,034

FOURTH CLASS.—*Concluded.*

Carnegie, A. F.	9,788
Caw, James	9,789
Chapman, James	9,790
Charles, A. H.	10,130
Christensen, Andrew	10,204
Clement, W. H.	9,802
Clutier, J. A.	9,942
Cole, Henry	9,763
Costello, R. J.	9,803
Darbyshire, John	9,690
Darrah, Howard	10,093
DeWitt, William	9,744
Dennis, A. G.	9,873
Denny, James	10,042
Devine, Peter	10,167
Dobney, Henry	10,140
Duffus, J. R.	10,206
Eccles, J. H.	10,035
Edwards, W. C.	9,916
Emerson, Basil	10,207
England, G. P.	9,814
Essler, Henry	9,766
Feeney, F. R.	10,033
Finch, M. H.	9,943
Foulis, Robert	9,792
Fraser, C. F.	9,711
Frost, Lester	9,793
Fraser, George	9,876
Fulmer, C. D.	9,930
Goethe, Ernest	9,842
Gordon, John	9,917
Graham, W. F.	9,746
Grant, W. P.	10,001
Graham, F. A.	10,002
Hastings, A. G.	9,860
Hardie, C. H.	9,909
Harris, John	9,946
Haybarger, C. P.	9,958
Heenan, Nicholas	10,096
Hendrickson, Frederick	10,213
Hills, W. E.	9,769
Hicks, A. R.	9,844
Hodgson, Cecil	9,747
Howard, Alfred	9,879
Hutton, J. S.	9,900
Jacques, W. C.	9,880
Joyce, William	9,733
Jordan, J. C.	10,005
Kitching, A. E.	9,770
King, W. J. G.	9,970
Kirkpatrick, J. A.	10,183
Klausman, Frederick	9,977
Klem, John	10,143
Knox, T. J.	9,817
Lambe, H. J.	9,748
Larsen, Lars	10,220
Lee, J. H.	9,679
Leonard, R. W.	10,221
Lowrey, David	9,807
Lodge, G. E.	10,111
Malcolm, K. J.	9,715
Mahony, James	9,796
Marshall, William	9,861
Mayall, James	9,882
Martin, G. H.	9,884
Maxwell, James	9,885
Massey, J. W.	9,886
Miller, O. R.	9,775
Mole, John	9,797
Morrissey, W. E.	9,830
Monahan, N. M.	9,897
Morton, T. W.	10,223
Murphy, A. A.	9,927
Murphy, John	9,935
Macdougall, Richard	9,680
McDowell, James	9,685
Macdonald, Alexander	9,717
MacDougall, Alex	10,226
MacFarlane, Matthew	10,145
McHugh, Frank	9,986
MacIntosh, D. D.	9,962
McLeod, Donald	9,750
McLennan, H. W.	10,228
McMillan, Robert	10,146
McNeil, Duncan	9,799
McPherson, J. D.	10,229
Nelson, G. I.	9,959
Peabody, H. M.	9,987
Pearce, William	10,011
Phipps, C. S.	10,099
Pitman, A. J.	9,911
Radford, R. R.	9,800
Ross, R. L.	9,952
Robertson, Robert	9,989
Roots, Ernest	10,040
Ross, J. M.	10,232
Sanderson, E. D.	9,752
Schluter, E. A.	9,972
Shouse, A. H.	9,721
Simpson, James	9,928
Smith, A. J.	9,839
Smart, Charles	10,135
Smith, H. J. W.	10,259
Spooner, F. W.	9,810
Stoneson, Henry	9,753
Stuart, J. G.	9,847
Stewart, D. T.	9,978
Taylor, H. H.	9,938
Tweedie, C. J.	10,151
Van Dewater, Jules	10,237
Warne, O. H.	9,849
Wales, H. G.	9,853
Ward, Harry	10,015
Warwick, G. E.	10,152
Weckert, Otto	9,973
Whitson, W. H.	9,780
Whitlan, W. J.	9,801
Wheeler, Amos	9,939
Wolfram, C. F.	10,241
Young, W. A.	9,975
Young, J. H.	10,243

SPECIAL LOGGING-DONKEY.

Ball, Edward	9,741
Dickie, Lee	10,000
Grieg, H. J.	9,745
Hann, Edmund	10,037
Hill, John	9,947
Lougheed, D. H.	9,896
Quick, Nels.	10,047
Sweetman, Victor	9,777
Tack, Gustaf	9,833

SPECIAL LOGGING-LOCOMOTIVE.

Kusha, John 9,901
Miller, O. R. 9,774
Mulroney, W. D. 10,027
Montgomery, E. J. 10,224
Scott, Thomas 10,252

SPECIAL CREAMERY.

Jenne, R. E. 10,217
Kelly, Paul 10,262

SPECIAL ROAD-ROLLER.

Hadley, L. A. 9,877

SPECIAL HEATING.

Allen, A. O. 9,760
Arthur, T. E. 9,868
Balsamo, John 10,064
Besner, Oliver 9,979
Bloomfield, Joseph 10,066
Bone, T. A. 9,870
Braden, W. A. 10,201
Campbell, J. J. 9,729
Carroll, D. J. 9,969
Collins, J. V. 9,872
Davis, Frederick 10,092
Deardon, Alfred 9,691
Douglas, H. R. E. 9,678
Doyle, T. V. 10,067
Edwards, J. W. 10,131
Fee, Charles 10,044
Fowles, R. W. 9,875
Frostrup, Jacob 10,209
Fussel, George 10,168
Gale, Stanley 10,068
Gregg, H. E. 10,077
Halsey, J. C. 9,982
Hardy, George 9,983
Hand, H. S. 10,036
Hamilton, A. Y. 10,095
Halpenny, T. P. 10,132
Hardy, P. C. 10,138
Hesson, Alexander 10,214
Hickman, E. A. 10,085
Hind, H. W. 10,178
Ivey, W. E. 10,119
Johnston, John 9,984
Johnston, James 10,218
Kennedy, H. S. 10,155
Latham, Gordon 10,219
Little, John 10,086
Mazzoca, Primo 10,078
Marsh, William 10,180
Melbourne, George 10,113
Michell, Theophilus 9,819
Murdoch, George 10,225
McAuley, Alexander 10,087
McLennan, R. R. 9,921
McLachlan, W. G. 10,133
McNee, Duncan 10,098
McPhee, Alexander 10,025
Patrick, F. T. 10,230
Parkin, Harry 9,838
Peterson, William 10,231
Plenderleith, W. A. 9,960
Platts, C. E. 10,079
Pope, A. J. 9,724
Ratchford, J. E. 9,988
Richards, W. A. S. 9,738
Ronci, Attilio 9,837
Ross, J. E. 10,088
Ryan, Peter 10,019
Saunders, J. R. 10,150
Scriver, A. R. 9,827
Schultze, Fred 9,990
Stockdale, William 10,080
Swalwell, R. F. 10,120
Sweet, M. H. 10,156
Tomson, Thomas 9,820
Walker, Daniel 10,238
Wilson, John 9,683
Wilmer, F. W. 10,153
Wyatt, William 9,823
Yardley, A. J. 10,048

TEMPORARIES.

Allan, Robert 10,137
Bampfield, J. C. 9,688
Baker, Alfred 9,905
Barr, Malcolm 9,929
Beattie, Archie 9,758
Beckman, C. E. 10,187
Binch, R. H. 9,996
Biassotti, Charles 10,026
Binden, F. C. D. 10,051
Bond, Sidney 10,122
Brown, C. R. 10,157
Brayer, L. V. 10,193
Bucke, F. D. 10,020
Candy, George 9,689
Caverly, W. W. 10,073
Chapman, Thomas 9,673
Chatters, O. L. 10,244
Colclough, Arthur 9,754
Conley, Timothy 9,904
Colclough, Alan 10,049
Cochrane, John 10,171
Crowther, F. W. 10,158
Daly, Edward 10,050
Demuth, J. F. 9,781
Dixon, James 10,254
Domannick, Charles 10,056
Dowell, W. W. 10,121
Dunne, T. H. 9,964
Durand, Francois 10,188
Duguid, W. G. 10,194
Evans, Samuel 10,057
Everett, Joseph 10,123
Faulkner, J. W. 10,124
Fee, Charles 9,725
Firth, J. G. 9,782
Fleck, John 9,850
Fox, Henry 9,674
Frisby, T. G. 10,189

TEMPORARIES.—*Concluded.*

Gesner, N. F.	10,081
Grindrod, Albert.	9,675
Grinnell, V. C.	9,722
Hart, Harry.	9,894
Hardie, George	9,735
Halsey, J. C.	9,783
Hawkes, C. R.	9,895
Harms, P. W.	9,997
Harris, William.	10,102
Hardie, Edward.	10,172
Hellier, W. J. G.	9,739
Hebert, Hector	10,062
Henderson, R. A.	10,082
Hultman, J. A.	10,103
Johnson, Carl.	10,021
Johnson, W. T.	10,058
Jones, Edward.	10,163
Johnson, J. H.	10,245
Kendrick, Josiah.	9,755
Kendrick, E. D.	9,756
Kennedy, Archie.	9,851
Kendall, A. J.	10,023
Keyes, Robert.	10,030
Knight, C. W.	10,090
Lees, John	9,784
Lepage, Isaac.	9,965
Leith, G. H.	9,976
Lecrom, Joseph	10,024
Lovatt, J. H.	10,104
Lockie, Robert.	10,136
Lowdon, Joseph.	10,255
Machin, C. J.	9,736
Mayhue, E. D.	9,785
Marsh, William	9,828
Martin, Frank	10,246
Middleton, F. H. J.	10,128
Moreland, Thomas	9,676
Moore, T. H.	9,963
Moreton, Andrew	10,074
Mulroney, W. D.	10,105
McCoy, D. S.	9,854
McConnell, W. H.	10,083
McCarthy, John	10,159
McDonald, Harvey	10,164
McDonald, H. C.	10,195
McInnes, A. G.	10,256
McKenzie, R. G.	9,726
Mackay, Donald	10,173
McLeod, A. A.	9,940
McMullen, J. E.	9,723
McPhee, G. A.	10,061
Nightingale, Robert	10,160
Noble, Andrew.	9,727
Ogilvy, D. W. C.	9,835
Orchard, George	9,893
Parkinson, F. J.	10,247
Penrose, E. C.	9,995
Pearson, R. W.	10,174
Ponsette, T. W.	9,677
Potter, J. W.	10,031
Powell, George.	10,125
Raicos, Ernest	9,737
Reeds, Harry	10,091
Royle, James	9,757
Robinson, V. G.	10,126
Rogers, David	10,256
Scribbons, W. H.	9,728
Scholes, James.	10,052
Schram, G. P.	10,084
Schulze, Fred.	9,724
Sebring, W. F.	9,906
Shellito, F. C.	9,824
Sholander, Lars	10,161
Smart, Henry.	9,991
Smith, G. H.	10,053
Smith, A. A. P.	10,106
Smith, James.	10,162
Smith, Samuel.	10,260
Stinson, J. J.	9,913
Stobie, A. W.	9,955
Stevens, A. S.	10,054
Swalwell, R. F.	9,786
Taylor, W. J.	9,687
Taylor, J. T.	9,829
Tapping, J. C.	10,059
Tait, D. L.	10,190
Thomas, F. D.	10,063
Tha, John.	10,075
Thompson, Charles.	10,196
Tipton, R. L.	10,192
Tomlinson, T. R.	9,834
Tomkinson, Arthur	9,966
Todd, H. W.	10,060
Trent, John.	10,055
Tweedie, C. W.	9,892
Washburn, George.	9,855
Wagner, Joseph.	10,107
Waran, Porterfield.	10,127
Waring, G. E.	9,840
Wilhelm, Oscar.	9,967
Williams, C. F.	10,089
Wilson, James.	10,191
Woods, W. S.	10,022

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