

Inspection of Gas-, Oil-, Water-, and Electric-driven Machinery, including Lifts.

These appliances have increased greatly again during the year, and quite a number of the oil-engines have been locally manufactured. The total number of inspections made amount to 14,154, being an increase of 1,749 inspections this year. At the end of the year there were several hundreds of these inspections still overdue. I have not the staff to cope with these increases.

Fencing and Guarding Machinery.

There were 1,629 notices to guard machinery given during the year. There were several reported accidents with machinery during the year, some of them proving fatal. It is a difficult matter to provide for the guarding of all machinery in motion, and some judgment and care must at all times be exercised by the attendant. Suitable clothing should be worn, especially by women, who have been largely employed in factories to take the place of men since the war started. An account of these accidents is reported on in an appended return.

Boilers inspected.

During the year 7,034 boilers were inspected, or nearly a hundred more than last year. There were 948 defects discovered, and of this number 14 were very dangerous; 587 notices were issued to repair boilers.

No difficulty has been experienced in getting owners to make the necessary repairs to their boiler plants, which shows that they do not object to the advice of practical men. As a matter of fact they are glad to see our officers each year to get advice on many points.

All dairy-factory boilers have, so far as was possible, been inspected in the off season. The seasons seem to lengthen and the number of factories to be inspected increase each year, and it is therefore difficult to suit all owners.

New Boilers inspected.

The new boilers inspected have been of various sizes. Boilermakers are finding it increasingly difficult to work to their standardized drawings because they have so little choice in the thicknesses of plates for the shells of boilers. In some cases it has been found necessary to use thinner plates for boiler-shells than would ordinarily have been used, and in order to obtain the required working-pressure for such plates a higher class of longitudinal seam has been fitted. In endeavouring to increase the strength of the joint designers have proposed a wider pitch of the rivets, in some cases wider than is considered prudent. Too wide a pitch is not conducive to good caulking; it allows the plate to spring between the rivets. The necessity for stronger joints has brought about a decrease in the number of lap joints for longitudinal seams. The extra expense involved in the making of a double butt joint is more than compensated for by its superiority over the lap joint. Whilst necessity has compelled a closer attention to the stresses in the cylindrical shell of the boiler, it is to be regretted that the same study is not made of those parts of the boiler which require to be stayed. The ends of a boiler are often unnecessarily weakened through the stays being irregularly distributed. Stays should be arranged in squares or nearly so, and they should not, without a very good reason, be placed closer to the edges of the plates than the distance between them. The competition between local and outside firms will probably become very keen after the war, and the electric motor must displace the steam-engine in some instances. It is therefore imperative that material should not be wasted. The best boiler always has some excess material, but it is placed at the parts subject to the greatest deterioration.

No reports have been received regarding bad workmanship in the new boilers. Our New-Zealand-made boilers are excellent in this respect. When the hydraulic test was being applied to an imported boiler it was noticed that one of the ends, which was a dished one, was bulging. An examination showed that the end plate was considerably under the specified thickness as shown on the drawing. Further investigation led to the discovery of a similar error in some other boilers which were being installed at the same time. The ends have now been suitably strengthened.

During the year 150 new boilers were inspected: of this number 88 were made in the Dominion and 62 were imported.

The following table gives the districts to which the new boilers have gone, the horse-power, and whether made in the Dominion or imported:—

District.	Local.		Imported.		Total.	
	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.
Auckland North	5	52	3	44	8	96
Auckland	19	162½	10	400	29	562½
Auckland South	2	18	15	206	17	224
Canterbury	15	37½	2	5	17	42½
Hawke's Bay	5	29	3	15	8	44
Nelson	1	4	...	...	1	4
Nelson South	1	14	...	...	1	14
Otago	9	62½	6	15	15	77½
Southland	3	11	4	23½	7	34½
Taranaki	9	179½	5	17½	14	197
Wellington North	8	36	10	278½	18	314½
Wellington	8	184½	4	10½	12	195
Westland	3	17	...	...	3	17
Totals	88	807½	62	1,015	150	1,822½