boilers are, however, of a special design suitable for installing with any steam plant. Progress in the matter of design is evident in the locomotive and traction types of boiler. One firm is making a corrugated or grooved form of flat plate which is self-supporting and does not require staying. Another firm is dispensing with the stayed construction by forming such plates as were usually flat in the form of cylinders or portions of cylinders. Every stay or other hole in a boiler is a potential source of leakage and consequent corrosion. Such construction should prolong the life of the boiler and facilitate the cleaning of the internal surfaces. Local firms continue to make numbers of boilers for dairy factories, freezing-works, &c. Some of these boilers of the multitubular underfired type are of large size, 70 and 85 nominal horse-power. During the year replies have been received from some twenty-six firms in Great Britain and America in answer to requests for particulars of the ship and boiler material manufactured by them. This information has now been printed on a sheet in a handy form for reference; the sheet shows the class of material manufactured by the different firms, the brands used to distinguish the various classes of plates, &c., the position of the brands, and any other information of interest which was received. The number of new boilers inspected during the year was 347; 162 of these were made in the Dominion and 185 were imported. The following table gives the districts in which the new boilers were installed, their horse-power, and also states whether they were made in the Dominion or imported:—

District.	Made in Dominion.		Imported.		Total.	
	Number.	Horse-power.	Number.	Horse-power.	Number.	Horse-power.
Auckland	14	130	22	239	36	369
Auckland North	6	52	4	82	10	134
Auckland South	7	62	18	980	25	1,042
Canterbury North	20	201	12	34	32	235
Canterbury South	3	29½	..	..	3	29½
Gisborne	6	15	5	23	11	38
Hawke's Bay	14	27	23	152	37	179
Marlborough	4	12	2	5	6	17
Otago	10	68	20	205	30	273
Southland	10	146	20	50	30	196
Taranaki	5	44½	15	35	20	79½
Taranaki North	8	43½	5	209	13	252½
Wellington	29	126	30	1,068	59	1,194
Wellington North	20	156½	5	37	25	193½
Westland	6	80½	4	39	10	119½
Totals	162	1,193½	185	3,158	347	4,351½

Inspection of Boilers.

The number of boilers inspected this year totals 7,746. This shows an increase of 473 on the number inspected last year.

The total number of defects in boilers was 1,592, and of this number 334 were very dangerous. No boiler-explosion occurred during the year, which shows the efficiency of close inspection made by reliable and competent practical men.

In October last year it was reported that a fly-wheel of an engine had exploded. The fly-wheel was attached and formed part of a steam-engine plant driven by steam generated by a steam-boiler. The damage was estimated at £13,000. It is not generally realized how dangerous fly-wheels are, and a few remarks concerning them may be useful to steam-users having no technical knowledge of them. The most common cause of fly-wheels bursting is from an increase of speed due to defective governors or valve-gears. The main stresses in a fly-wheel are the result of the centrifugal force of the rim due to the speed at which the fly-wheel revolves. There is no possible way of overcoming these stresses. If the sectional area of the rim is increased to make a stronger rim the centrifugal force is increased likewise, because of the added weight of the rim, and the wheel is no stronger than before. There is a definite speed at which any wheel will explode, however sound, and regardless of the amount of material it contains. This theory is a mathematical truth, and has often been verified by practice. Cast-iron wheels cast in one piece should not be run at a greater peripheral speed than a mile a minute. For built-up wheels the speed should be much less, and according to the design of the rim-joints; some rim-joints have a strength equal to 25 per cent. only of the solid rim. The stresses in a revolving fly-wheel increase as the square of the speed—that is to say, if the speed attains double the normal speed the stresses will be four times the normal stresses. This rapid increase of stress due to speed is the reason why wheels amply safe at ordinary running-speeds go to pieces without warning and cause such destruction. Fly-wheels are ordinarily made of cast iron, and require to be thoroughly examined periodically for flaws and defects. Steam-users should see that all governor and valve gear is kept in first-class condition, so that the danger of the engine running away is minimized. A fly-wheel merely averages the speed of an engine during one revolution, and prevents violent changes in the rate of motion in that time. The number of revolutions per minute can only