this trouble having actually developed in the original layout. The plant has been remodeled in many respects since first installed and this work has been done under the supervision of A. D. LePan, Joint Superintendent of Buildings and Grounds, under whose direct supervision the plant is operated.

Efficiency Test of Boiler Plant

The object of the test was to find the efficiency of the boiler plant under actual working conditions. While the boilers were cleaned shortly before the test, there was no special preparation made to insure anything but a normal efficiency.

The test was conducted by the writer assisted by J. D. Thompson, Demonstrator in Mechanical Engineering, and the members of the 1916 graduating class. A. D. LePan, Joint Superintendent, and W. H. Bonns, of the Superintendent's office, gave every assistance in preparing for the test. The operation of the plant was under the direction of C. Moseley. The accompanying table embodies in its detail the various factors entering into the test, together with the obtained results:

FIG. 11. THREE SMART-TURNER DUPLEX BOILER FEED PUMPS WITH OUTSIDE END-PACKED PLUNGERS AND POT VALVES.

1	Name of Plant	University of Toronto Heating and Lighting Plant
2	Number and kinds of boilers	Five Babcock and Wilcox water tube
3	Kind of furnace	Murphy Automatic
4	Grate Surface—Inclined grates—	
	Projected area	328 sq. ft.
	Actual area	454 sq. ft.
5	Heating surface— Total	21,264 sq. ft.
8	Date	Jan. 17th, 1916
9	Duration	11 hours
	Average Pressures, Temperature, Etc.	
10	Kind and size of coal	Vinton, Slack
11	Steam pressure by gauge	153 lbs per sq. inch
12	Steam pressure absolute	167.6 lbs. per sq. inch
13	Temperature of feed water entering boiler	173° F.
14	Temperature of escaping gas leaving boiler	487° F.
15	Force of draft between damper and boiler	0.47" water
	(a)—Draft in furnace	0.16
16	State of weather	Fair and cold (10° above zero)
17	Percentage of moisture in steam	1.5%
18	Factor of correction for quality of steam	98.5%
19	Total coal as fired	67,900 lbs.
19a	Total sifttings weighed back and credited to furnace	6,130 lbs.
19b	Total net coal as fired	61,770 lbs