## CANADIAN CONTRACT RECORD.



## BNGLISH PRACTICE IN THE MANU-FACTURE OF CAST-IRON PIPES.\*

BY STEPHEN H. TERRY, M.I.C.B.

The patterns are drawn out vertically by cranes. Special care is taken in selecting good binding sand, which is all worked up with edge runners, and is of an orangered colour. For some purposes a certain proportion of clay is ground up with the sand, and for loam moulds a further mixture of horse dung and a larger proportion of clay is added. The loam cores are built upon rigid hollow iron core bars, which in the larger sizes are of the collapsible type to admit of their removal after metal has set and is cooling, and by shrinkage, compressing the core. The use of organic material, such as horse dung, for cores is for the purpose of providing a somewhat compressible medium whilst cooling and shrinkage are taking place, the vegetable fibre in the dung, too, being largely consumed by the heat of the core ovens, which are heated by producer gas, and by the subsequent heat of the molten netal. Large volumes of gas are then given off, and escape through the vents provided in the mould, leaving in place of the fibre a porous ash of carbon and silicon. The pipe moulds are all grouped concentrically in pits round suitable radial cranes, and in Messrs, Cochrane and Co.'s works some 12 cupolas are in constant use, and melt from 150 to 200 tons of iron per day. Pipes of all sizes are cast with a considerable head of metal, which is afterwards cut off, it serving the double purpose of providing a space in which any impurities in the molten iron may accumulate, and of exerting a suitable pressure, thus causing the iron to fully feed and fill the mould during preliminary cooling.

At the Woodside Works all pipes are . carefully tested by hydraulic pressure, various tests being specified and employed, ranging from 300 lb. per inch upwards, according to the pressure for which the pipes are required. There are a number of pipe-testing machines on the premises, so situated that the pipes pass them on their way to the barge wharf, before reaching which they are (if proved satisfactory) heated and dipped in Dr. Angus Smith's composition, which consists of a mixture of gas tar and pitch. The largest testing machine will take 48 in. pipes of standard length, and by the use of ingenious hydraulically moved caps the operation of centering a pipe weighing six tons, filling it with water, putting on the pressure, emptying and passing it into the roller path, does not take more than to minutes per pipe. The whole of the hydraulic plant (except pumps and accumulators) in use at Woodside was designed by Mr. Brooks, the works foreman, and constructed in the works. An intensifier situated near the large pipe-testing

machine will give any pressure up to 1,200 1b. per inch. On the occasion of the author's visit, large numbers of 42 in. pipes were being cast for the Birmingham Waterworks; these are 11/8 in. thick, and have steel hoops shrunk on at the socket end. The iron used for pipe-founding is subjected to the following tests: Several bars are cast from each run of pig, and then machined and emery ground to the following dimensions-viz., 3 R. 6 in. long by 2 in. deep and 1 in. thick, each bar weighing about 21 lb. These are tested in a "Kennedy" bar tester with knife-edged supports 3 ft. apart, upon which the bar is placed with the depth vertical. The load is applied gradually by means of a weight drawn by cords along a scale beam, when a load of from 28 cwt. to 30 civit. is frequently attained before fracture occurs, the deflection reaching '375 in. shortly before fracture. The test for tensile strength is by means of a bar 1 ft. long, cast with shoulders formed so as to drop into clamps; the bar for a length of about 6 in. is turned down to 11/2 in. diameter, and the pressure is gradueny applied until a load of seven, and sometimes eight, tons is reached, and must remain on for 24 hours without causing fracture. In a test carried out in the presence of the author, fracture actually occurred with a load of 1114 tons.

A table of the standard sizes, thicknesses, and weights of cast-iron waterpipes adopted by Messers. Cochrane & Co. is appended.

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STANDARD WATER PIPES, MESSRS. COCH-RANE AND CO., DUDLEY. Diameter. Thickness. Length. Weight. Inclies. Irect. Cwt. qr. 1b. 2 4 6 0 2 0 21/2 4 6 0 2 14

4	T	0	U U	- 24	0
21/2	1	6	0	2	14
3	<b>†</b>	9	I	0	14
4	ł	9	I	2	Ó
5	र्त्त	9	2	0	0
6	र्रेंच	9	2	2	0
8	¥.	9	3	3	0
9	<b>1</b>	9	4	3	0
10	- f	9	5	3	[4
12	<u>+</u>	12	9	ο	0
14	+	12	10	1	0
15	ŧ	12	12	3	0
16	7	12	13	3	0
20	Ŧ	12	21	Ō	0
24	Ŧ	12	25	0	0
30	1	12	35	ο	0
36	1	12	43	0	0
42	1	12	50	2	o

Messrs. Cochrane and Co. do not recommend a less thickness than from  $1\frac{1}{2}$ in. to  $1\frac{1}{2}$  in. for pipes of 42 in. and upwards n diameter.

The Farmers' Electric Water & Telephone Company has been incorporated at Cardston, N. W. T.

Mr. G. H. Richardson has received the appointment of assistant city engineer of Ottawa, to succeed the late Mr. Cranston.

Mr. G. H. Duggan, chief engineer of Dominion Bridge Company, Montreal, has been appointed consulting engineer for the Dominion Iron & Steel Company, of Sydney, N. S.



GOVERNMENT, RAILROAD and MUNICIPAL SECURITIES.

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Fobruary 5, 1901