

and E. Blake heating and plumbing.—School building in Carleton. B. Mooney & Sons, contractors; Andrew Myles, subcontractor for carpentry.—The following tenders were received by the council for supply of special castings and water pipe: 12 tons special castings—R. D. Wood Co., Philadelphia, 2 3/4 cents per pound, ex vessel, St. John Iron Works, St. John, 2 1/2 cents a pound, (accepted); Jas. Fleming, St. John, 3 1/2 cents a pound or \$2.95 a hundred; Londonderry Iron Works, 2 1/2 cents, landed in St. John; U. S. Cast Iron Pipe and Foundry Co., 2 1/2 cents a pound landed at St. John, ex duty. 118 tons cast iron water pipe—U.S. Cast Iron Pipe and Foundry Co., \$22.90 per ton, ex duty; R. D. Wood Co., Philadelphia, \$22.80 a ton, ex vessel, exclusive of duty, which is \$8 a ton, (accepted); Londonderry Iron Works, \$31 a ton, landed in St. John.

TORONTO, ONT.—The Board of Control last week awarded the following contracts: Asphalt pavements—Huron street, Cecil College, \$4505, and Leopold street, from Jameson to Dowling, \$3918, W. G. McKendrick; Fahey avenue, Bathurst to Tecumseh, \$406, Barber Asphalt Company. Macadam roads—St. Joseph, from St. Vincent to 698 feet west, \$2980, and Isabella street, Yonge to Jarvis, \$6407, Constructing and Paving Co. Cedar block pavement—Alma avenue, Gladstone to Dufferin, \$740, W. F. Grant & Co. Asphalt pavement repairs, Dominion Paving Co. Concrete sidewalks—Queen street, A. Gardner & Co., \$1.68; Elm street, A. Gardner & Co., 69c.; Gerrard street, 69c., W. Millichamp; Huron street, 59c., A. Gardner & Co.; Gerrard street, \$1.12, Constructing and Paving Co.; Carlton street, 68c., W. Millichamp; Dunbar road, \$1.08, A. Gardner & Co.; Front street, \$2.74 1/2, W. F. Grant & Co.; Hayden street, 47c., Grosvenor street, 67c., St. George street, 69c., Rose avenue, 68c., all to A. Gardner & Co.; Lowther avenue, \$1.50, City Engineer. Sewers—Lee avenue, \$300, and Glen road, \$1000, City Engineer.

BLASTING.

The plan most economical of powder would be to fire 5, 7, 9, and 11 in the second volley; 6, 8, 10 and 12 in the third, and 13, 14, 15, 17, 18, 19 and 20 in the fourth. Conditions, however, might render it more economical to use larger charges in holes 6, 8, 10 and 12, and include them in the same volley with 5, 7, 9 and 11. All the enlarging shots are breaking to two free faces, being nearly the equivalent of bench blasting, and they all have relatively short lines of least resistance, properly proportioned to the depth of the holes. The last volley serves the purpose of "trimming-up" shots, so that the walls left should be clean and true. In order to avoid irregularities in the walls it is essential to start these holes

as close to the walls as possible, and to give them very little inclination from the perpendicular, and then to maintain exactly correct proportions between the line of least resistance, the diameter of the hole and the charge used.

V-SHAPED CENTER CUT.

In Fig. 6 is shown the V-cut, which offers two advantages. There are fewer dry holes to be bored, and the "key" can be broken out with smaller charges, since 1, 2, 3, and 4 are short holes, as appear in the section on A B, the line of least resistance for these being correspondingly short. These four constitute the first volley and provide shorter lines of least resistance for the remaining breaking in shots, 5, 6, 7 and 8, which make the second volley. The third volley comprises holes 9, 10, 11, 12, 13 and 14; and the fourth volley, which trims up, includes 15, 16, 17, 18, 19, 20, 21 and 22.

These will serve as suggestions for economical work under normal conditions in hard homogeneous rock, special conditions requiring suitable modifications.

The consumption of explosives in practice is found to be approximately as follows:

For small blasts in open working, 1/4 to 1/2 lb. of black powder, and 1-16 to 1/8 lb. of dynamite per ton of rock.

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For large blasts in open workings, 20 to 1/2 lb. of black powder, and 1-24 to 1/8 lb. of dynamite per ton of rock.

For headings, tunnels and shafts, 1/2 to 2 lb. of dynamite per ton of rock.

THE LONG-HOLE METHOD.

Deep bore holes, or the long-hole method, has been adopted in both shaft sinking and in bench blasting, in open cuts and in large stopes. In the case of shaft sinking a series of diamond drill holes are bored to the full depth of the shaft, and filled with sand. A sufficient depth is left empty to receive a charge of 75 per cent. dynamite, and the holes are fired simultaneously. Then sand is spooned out to make room for another cut, and so on to the bottom. Although the line of least resistance coincides with the line of the bore-hole, this disadvantage is offset by the use of the high-power dynamite, and by the great saving of time and cost in drilling. In adapting this method to bench blasting holes are drilled as deep as convenient in parallel rows, filled with sand as before, and successive slices are then blasted off. Where conditions render this system capable of adoption it affords highly economical results.

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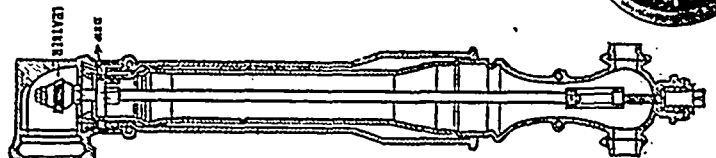
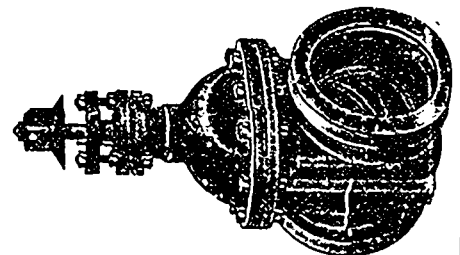
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