

pounds each (including price of sacks), and \$2.10 to \$2.20 in wood, per 350 pounds, gross. Belgian cement is quoted at \$1.75 to \$1.90 per barrel, in wood. German is \$2.52 to \$2.55 per barrel of 400, for Dyckerhoff.

Copper.—The tone of the copper market is very firm. Quotations are: 26½ to 27c., Montreal.

Iron.—The local situation is changed only to the extent that supplies are now arriving and are being largely distributed, the result being that immediate necessities are being cared for. The situation is consequently much relieved. The trade here is enquiring for deliveries extending over the remainder of the year and fair sales are being made at slightly higher prices. Londonderry is still unobtainable for immediate shipment, while prices for the second half are on a basis of about \$25 f.o.b., Montreal, for No. 1. Toronto prices are about \$1.25 more. Summerlee iron is arriving, and is quoted at \$24 f.o.b., cars, Montreal, for No. 2 selected, and \$25 for No. 1. No. 1 Cleveland is quoted at \$21.50 on cars, Montreal, and Clarence at \$20.50 to \$21. Carron is more or less nominal. There is a good demand, but considerable uncertainty as to price. No. 3 Carron is nominal at \$24, special at \$24.50, and No. 1 at \$25.75.

Lead.—The market holds quite steady, and the tone is firm. Present quotations are \$5.35 to \$5.45 per 100 pounds.

Nails.—Demand for nails is keen, the quantity required being exceptional. Prices are \$2.50 for cut, and wire, base prices.

Pipe.—Cast Iron.—The market is very firm and active. Water pipe is quoted as selling at from \$37 to \$38 per net ton at the foundry, and at about \$38 to \$39 Montreal, gas pipe being about \$1 more.

Pipe.—Wrought.—Demand exceeds supply and prices are firm. Quotations for small lots, screwed and coupled are as follows: ¼-inch to ¾-inch, \$5.50 with 58 per cent. off for black and 43 per cent. off for galvanized; ½-inch, \$8.50, with 67 per cent. off for black, and 57 per cent. off for galvanized. The discount on the following is 67 per cent. for black and 57 per cent. for galvanized; 1-inch, \$16.50; 1¼-inch, \$22.50; 1½-inch, \$27; 2-inch, \$36; 2-inch, \$75.50, and 4-inch, \$108.

Steel Shafting.—Dealers expect a very heavy advance in the price of cold rolled steel within the next few weeks. Demand is good, and sales have been quite satisfactory of late. Prices hold steady at 30 per cent. off the price list, but there seems to be an expectation that this discount will be reduced to perhaps 20 per cent.

Steel Plates.—Demand is good, and the market firm. Prices for small lots are \$2.75 for 3-16 and ⅝, and \$2.55 for ¼ and thicker.

Structural Steel.—Demand is generally reported to be active. Beams weighing 55 pounds per foot are quoted at 3c. per pound, and those upon which work, such as punching holes, has been done at 3½ to 4c., while columns with caps bring 4c. Heavy sections, weighing 35 pounds, and upwards are quoted by some at 2¾ to 3c., and light sections at 3 to 3¼c., plain.

Spikes.—Demand is good and prices are firm. Railway spikes are quoted at \$2.75 per 100 pounds, base of 5½ x 9-16. Ship spikes are also in good demand, and prices are \$3.15 for 100 lbs. base, 5½ x 10-inch, and ⅝ x 12-inch.

Tin.—The market shows strength. Prices are 46 to 46½c., in jobbing lots.

Tool Steel.—The situation is fairly active and firm. Base prices are as follows: Jessop's best unannealed, 14½c. per pound, annealed being 15½c., second grade 8½c., and high speed, "Ark," 60c., and "Novo," 65c.; Sanderson's special, 14c. for unannealed, 15c. for annealed, and 8½c. for second grade.

Zinc.—There is nothing new in the situation, and prices are quoted firm, at 7¼ to 7½c. here, in a jobbing way.

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Toronto, 6th June, 1907.

There are signs of relief to the scarcity of structural metal goods in this market and at other Ontario points. The sort of hasty congestion in pig iron stocks on the wharves of Montreal has hampered deliveries to the West. But pig is moving pretty steadily now at prices given below, although there cannot be said to be anything like a stock in Toronto. A welcome addition to the scant supply of boiler tubes has been made this week; the larger sizes are in fairly good stock, but the smaller still scarce.

Metal houses and machinery houses or agencies are all busy. Structural shapes in steel are still hard to get, and there are complaints of slow deliveries. Copper is in no great supply at unchanged prices; nor is there any great stock of lead, which is firm. A fairly good demand exists for tin; antimony is very weak; zinc unchanged.

Demand for freight space both by rail and water is strong. Shipowners tell us that there is occupation for all

the tonnage available west-bound, the quantity of merchandise offering exceeding last year decidedly. At Montreal such heavy goods as pig iron, structural steel, wire, steel rails, are being taken in quantity for the far West, and a great deal of package freight as well. Both Hamilton and Toronto offer splendid cargo freights. And at Sydney the first cargo of rails under the recent contract between the Dominion Iron & Steel Company and the Montreal Transportation Company is being put on board the steamer "Glenmount" for Montreal and Fort William.

The railways have a great pressure upon them for freight accommodation, and the request for cars is greater than they can supply. This refers in particular to west-bound merchandise and household effects, but the demand in the West is equally clamorous.

We quote prices at Toronto as under:—

Antimony.—Very weak. Cookson's \$22.50.

American Bessemer Sheet Steel.—14 gauge, 2.60; 17, 18, and 20 gauge, \$2.80; 22 and 24 gauge, \$2.90; 26 gauge, \$3; 28 gauge, \$3.25.

Bar Iron.—\$2.30 from stock to the wholesale dealer.

Boiler Heads.—25c. per 100 pounds advance on boiler plate.

Boiler Plates.—¼-in. and heavier, \$2.50.

Boiler Tubes.—Lap-welded steel, 2-in., \$9.10; 2¼-in., \$10.85; 2½-in., \$12; 3-in., \$13.50; 3½-in., \$16.70; 4-in., \$21 per 100 ft.

Cement.—Star brand, \$1.95 per barrel, f.o.b., Kingston. National, \$1.95 per barrel, Toronto, in car lots; retail price, \$2.15.

Ingot Copper.—Quiet and unchanged. Toronto price, 26½c.

Lead.—Firm and supply insufficient; \$5.50 for pig.

Pig Iron.—Summerlee, No. 1, to arrive, \$27; No. 2, \$25.50, \$26; Cleveland, No. 1, \$23.50, \$24; Clarence, No. 3, \$24.

Steel Rails.—80-lb., \$35 to \$38 per ton.

Sheet Steel.—Firm, 10 gauge, \$2.70; 12 gauge, \$2.80.

Tank Plate.—3-16-in., \$2.65.

Tin.—Unchanged in price, 45c. for pig, very strong, and in fairly good demand.

Tool Steel.—Jowitt's special pink label, 10½c. per lb.

Wrought Steam and Water Pipe.—Trade prices per 100 pounds are: Black, ¼ and ⅜-in., \$2.31; ½-in., \$2.81; ¾-in., \$3.80; 1-in., \$5.45; 1¼-in., \$7.43; 1½-in., \$8.81; 2-in., \$11.88; 2½-in., \$19.50; 3-in., \$25.50. Galvanized, ¼ and ⅜-in., \$3.14; ½-in., \$3.66; ¾-in., \$4.95; 1-in., \$7.10; 1¼-in., \$9.68; 1½-in., \$11.61; 2-in., \$15.48; 3½-in., blk., \$32; 4-in., \$36.25.

Zinc.—Sheet zinc firm. Toronto, slab, \$7; sheet, \$8.

THE GAS ENGINE.

By R. A. Fraser.

It is a remarkable fact that the internal combustion engine combines within itself all the functions which in a steam plant call for a steam engine, boiler, feed pump, smoke stack, and the services of a man to operate it. Not only so, but when we stop to consider that the gasoline engine when applied to a motor cycle, the entire outfit weighing little over one hundred pounds, is capable of carrying a man weighing two hundred pounds for over one hundred miles on a consumption of one gallon of gasoline, we see the possibilities of this form of power as a means of cheap transportation. It must be evident to those of us who take an interest in matters mechanical that if mechanical flight is ever to be attained the gasoline engine promises to play an important part in the solution of this problem. It, therefore, behooves us to learn something of this power which has revolutionized transportation, and bids fair to revolutionize industrial life. The subject is an extensive one, and in order to deal with it in as concise a manner as possible I have thought it well to divide the paper under four general heads, namely:—

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| (a) Theory of operation, | (c) Types of engines, |
| (b) Fuels, | (d) Mechanical construction. |

Theory of Operation.

It is a well-known fact that to the German inventor, Dr. Otto, is due the credit for developing the internal combustion