

THE TESTING OF METAL CASTINGS FOR FLAWS.

One of the difficulties which hitherto has been insurmountable is the detection of flaws in castings and forgings. From time to time various appliances have been introduced, but as yet the discovery of weak spots within a piece remains unsolved. A French engineer, Captain Delaplace, has devised a new apparatus which promises better results. It consists of a small pneumatic tapper worked by the hand, and with which the piece of steel or iron to be tested is tapped all over. Connected with the tapper is a telephone, with a microphone interposed in the circuit. Two operations are required, one to apply the tapper, and the other to listen through the telephone to the sounds produced. These operations are in separate compartments, so that the direct sounds of the taps may not disturb the listener whose province it is to detect flaws. The two, however, are in electrical communication, so that the instant the listener hears a false sound he can signal to his colleague to mark the metal at the point of the last tap. In practice the listener sits with the telephone to his ear, and so long as the taps are normal he does nothing. Directly a false sound—which is very distinct from the normal sound—is heard, he at once signals for the spot to be marked. By this means he is able not only to detect a flaw, but to localize it. Some experiments recently made in England to test the apparatus on samples—steel and iron—belonging to the South-Eastern Railway Company. The first sample tested was pronounced to be bad metal throughout, while in others the flaws were localized. On breaking some of the bars of wrought and cast iron, the positions of the internal flaws were found to have been correctly ascertained. With some samples the inventor was less successful. It remains to be seen whether the "Scisiphone"—for so the instrument is called—will serve in the hands of such operators as are likely to be found on engineering works.

EXPANSION OF A LONG STEAM PIPE.

Several months ago, a careful determination of the expansion of a long steam pipe was made by direct measurement, at the University of Minnesota. The pipe was laid in a brick walled trench, or conduit, supported on rollers, and the experiment was made before covering up. This was a 4-inch wrought iron steam pipe, the part measured being a straight section 210,697 feet, or 2528.36 inches long, terminating at each end in an elbow.

The length was first accurately measured (between two points marked on the inner faces of the elbow flanges) by means of a standard steel tape.

At each end of the pipe, a strip of iron was built up in brick piers, so that the strip passed over the top of the pipe, a few inches inside of the elbow flange, with which it was parallel. The strips were stationary and entirely free from the pipe, so that by calipering the distance between a strip and the flange, before and after heating the pipe, the movement at that end could be accurately measured.

This operation was, of course, gone through with at the other end as well, the sum of the two giving the total elongation.

The measurements were taken between 3 and 4 p.m. of a cool, cloudy day, and as the temperature had been very constant for several hours, it was assumed that the temperature of the pipe was the same as that of the air in the conduit, viz., 43 degrees F. Having taken the initial measurements and this temperature, steam was turned on and allowed to remain until no further expansion was observed. The temperature was read by a good thermometer and checked by a steam gauge, both inserted in the pipe. The average temperature was taken at 300 degrees, making the range of temperature 300-43 = 257 degrees. The elongation in the 2528.36 inches of pipe was found to be 2.28 inches at one end and 2.17 inches at the other, giving a total experience of 4.45 inches. The elongation per unit of length per degree Fahrenheit was therefore :

$$\frac{4.45}{2528.26 \times 257} = .0000685 \text{ units.}$$

This means that the expansion per degree F. was .0000685 of an inch per inch of original length, or the same fraction of a foot for each foot of the original length, etc. This is equivalent to an extension of .00822 inches in each 100 feet of original length, per degree, or to a linear expansion of 1.48 inches (nearly) per 100 feet, in changing the temperature from 32 degrees to 212 degrees.

Prices of Building Materials.

LUMBER.

CAN OR CARGO LOTS.

1 1/2 and thicker clear picks, Am. ins.	\$30 00	@32 00
1 1/2 and thicker, three uppers, Am. ins.	37 00	
1 1/2 and thicker, pickings, Am. ins.	27 00	
1 x 10 and 12 dressing and better.	18 00	20 00
1 x 10 and 12 mill run.	13 00	14 00
1 x 10 and 12 dressing.	14 00	16 00
1 x 10 and 12 common.	12 00	13 00
1 x 10 and 12 spruce culls.	10 00	11 00
1 x 10 and 12 maple culls.		9 00
1 inch clear and picks.	28 00	30 00
1 inch dressing and better.	18 00	20 00
1 inch siding, mill run.	14 00	16 00
1 inch siding, common.	12 00	12 07
1 inch siding, ship culls.	\$10 00	\$11 00
1 inch siding, mill culls.	8 00	9 00
Cull scantling.	8 00	9 00
1 1/2 and thicker cutting up plank.	27 00	25 00
1 inch strips, 4 in. to 8 in. mill run.	14 00	15 00
1 inch strips, common.	11 00	12 00
1 1/2 inch flooring.	14 00	15 00
1 1/2 inch flooring.	14 00	16 00
XXX shingles, sawn.	2 30	@ 2 35
XX shingles, sawn.	1 30	@ 1 35

Metallic Roofing Co. of Canada:

Eastlake steel shingles (galvanized),	\$5 25 to \$5 75
Eastlake steel shingles (painted)	3 75 4 00
Improved Broad Rib Roofing, (galvanized)	5 00 5 75
Improved Broad Rib Roofing (painted)	3 50 4 00
North Western steel siding (painted)	3 25 3 50
Manitoba steel siding (painted)	3 25 3 50
Metallic Finished Brick	3 25 3 50
Tower or Mansard shingles, (galvanized)	6 25
Tower or Mansard shingles (painted)	4 50
Metallic Terra Cotta Tiles	7 00
Price of Copper shingles according to weight, and "Hayes" Patent Metallic Lathing according to quantity.	

Canada Galvanizing & Steel Roofing Co.:

Corrugated Iron, galvanized, 26 W.G., per lb.	5 cts.
Corrugated Iron, galvanized, 28 W.G., per square.	5 1/2
Corrugated Iron, painted, 26 W.G., per square.	4 00
Corrugated Iron, painted, 28 W.G., Broad Rib Roofing, galvanized, per square.	3 50
Broad Rib Roofing, painted.	5 50
Westlake shingles, steel, galvanized, per square.	4 00
Westlake shingles, steel, painted.	5 00
Standard shingles, "Walter's patent," galvanized, per square.	3 50
Standard shingles, "Walter's patent," painted.	5 50
Northwestern steel siding, patented, per square.	4 00
Metallic Finish Brick, per square.	3 50
Metallic Finish Clapboard, per square.	3 25 3 50

YARD QUOTATIONS.

Mill cull boards and scantling	10 00
Shipping cull boards, promiscuous widths.	13 00
Shipping cull boards, stocks.	1 00
Herlock canting and joist up to 16 ft.	11 00 14 00
" " " 18 "	12 00 13 00
" " " 20 "	13 00 14 00
Scantling and joist, up to 16 ft.	14 00
" " " 18 ft.	15 00
" " " 20 ft.	17 00
" " " 22 ft.	19 00
" " " 24 ft.	21 00
" " " 26 ft.	23 00
" " " 28 ft.	25 00
" " " 30 ft.	27 00
" " " 32 ft.	29 50
" " " 34 ft.	31 00
" " " 36 ft.	33 00
" " " 38 ft.	35 00
" " " 40 to 44 ft.	36 00
Cutting up planks, 1 1/2" and thicker, dry board.	25 00 26 00
Cedar for block paving, per cord.	18 00 22 00
Cedar for Kerbing, 4 x 14, per M.	5 00 14 00

B. M.

1 1/2 inch flooring, dressed, F. M.	28 00	31 00
1 1/2 inch flooring rough, B. M.	18 00	22 00
1 1/2 " " dressed, F. M.	25 00	28 00
1 1/2 " " undressed, B. M.	18 00	19 00
" " dressed.	18 00	22 00
" " undressed.	12 00	15 00
Beaded sheeting, dressed.	22 00	35 00
Clapboarding, dressed.		12 00
XXX sawn shingles, per M, 16 in.	2 65	2 75
Sawn lath.	2 00	2 20
Red oak.	30 00	40 00
White.	25 00	45 00
Basswood, No. 1 and 2.	18 00	20 00
Cherry, No. 1 and 2.	70 00	70 00
White ash, No. 1 and 2.	25 00	25 00
Black ash, No. 1 and 2.	20 00	30 00
Dressing stocks.	16 00	22 00
Picks, American inspection.		40 00
Three uppers, American inspection.		50 00

BRICK—M

Common Walling.	\$7 50
Good Facing.	9 00
Sewer.	8 50 9 00

Pressed Brick:

Plain brick, f. o. b. at Milton, per M.	\$18 00
" " and quality, per M.	14 00
" " 3rd.	10 00
Hard Building.	8 00
Moulded and Ornamental, per 100.	\$3 10 10 00
Roof Tiles.	74 00
Diamond locking tile.	16 00
First quality, f. o. b. at Campbellville, per M.	18 00
2nd " " " "	14 00
3rd " " " "	11 00
Ornamental, per 100.	\$3 10 10 00
Tiles.	24 00

Stone.

Common Rubble, Per Toise, delivered	14 00
Large flat " "	18 00
Foundation Block, " Cubic Foot.	50

Slate: Roofing (per square).

" red.	18 00
" purple.	9 00
" unslating green.	9 00 14 00
" black slate.	7 75
Terra Cotta Tile, per sq.	25 00
Ornamental Black Slate Roofing.	8 25

Sand:

Per Load of 1 1/2 Cubic Yards.	1 25
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PAINTS. (In oil, per lb.)

White lead, Can.	6 25	6 50
" zinc, Can.	6 1/2	7 50
Red lead, Eng.	5 1/2	6 1/2
" venetian.	1 60	1 75
" vermilion.	90	1 00
" Indian, Eng.	10	12
Yellow ochre.	5	10
Yellow chrome.	15	20
Green, chrome.	7	12
" Paris.	35	40
Black, lamp.	15	25
Blue, ultramarine.	15	20
Oil, linseed, saw (& Imp. gallon).	68	72
" " boiled.	72	75
" " refined.	78	85
Putty.	2 1/2	2 1/2
Whiting, dry.	75	1 00
Paris white Eng., dry.	90	1 25
Litharge, Am.	6 1/2	8
Sienna, burnt.	15	20
Umber, "	8 1/2	12

CEMENT, LIME, etc.

Lime, Per Barrel of 2 bushels, Grey.	40
" " " White	55
Plaster, Calcined, New Brunswick.	2 00
" " Nova Scotia.	2 00
Hair, Plasterers', per bag.	1 00
Cement, Portland, per bbl.	3 00 3 50
" Thorold.	1 50
" Queenston, "	1 50
" Napanee, "	1 50
" Hull, "	1 50

HARDWARE.

Cut Nails:

American Pattern, 1 1/2 inch, per keg.	3 50
" " 1 1/2 to 1 3/4 inch, per keg.	3 70
Canadian Pattern, 1 1/2 inch, per keg.	3 40
" " 1 1/2 to 1 3/4 inch, per keg.	2 95
" " 2 to 2 1/4 inch, "	2 50
" " 2 1/2 to 3 inch, "	2 65
" " 3 inch and larger.	2 40
Steel nails 10c. per keg extra.	
Finishing nails, 1 inch, per keg.	5 45
" " 1 1/2 inch, "	4 65
" " 2 inch, "	4 15
" " 2 1/2 inch, "	5 90
" " 3 inch and larger.	3 90