

and give 729 H.P. to each generator, making in all 7,920 horse power. They will all be connected to one switch-board, and the power carried under high voltage to Montreal, where by rotary transformers it will be again reduced to straight current ready for use.

Below the dam will be a guard pier above the level of high water to prevent the ice entering and blocking the wheel pit. At the head of the head-race will be a boom 800 feet long to guide off floating bodies and throw the same clear of the dam.

The work is, perhaps, the largest undertaken in Montreal for some years, necessitating the removal of about 250,000 cubic yards of rock; the construction of about 3,500 running feet of crib-work 20 feet wide and about 10,000 yards of masonry and concrete, besides the construction of a water supply, drainage system, electric light plant, macadamizing streets and making cement sidewalks for the property on the shore, and which is included in the undertaking.

W. McLea Walbank and T. Pringle & Son, civil and hydraulic engineers, are the promoters of the company, backed by some of Montreal's influential and wealthy citizens and one Chicago capitalist. The engineers above referred to have given the matter careful study since 1891, and have taken close soundings, revealing the bed of the Rapids, the velocity of the water, and have the records of the state of the river since 1875. They have taken into consideration the action of anchor and frazil ice, and are satisfied that the means they have adopted in constructing the dams and head race will be satisfactory and free from this trouble Frazil, which is a great bugbear to all people having to do with water powers in Canada in winter, is never known to form in still water or under ice. As the proposed headrace will freeze over during the winter, it is believed no frazil will be formed in it. Therefore, only the frazil formed in the river above will have to be contended with. It is a well known fact that ice, when it gets into still water, will float to the surface, and in this case the dams and headraces will be arranged so as to take full advantage of this physical condition and that the power will consequently not suffer from it. Owing to the peculiar formation of the shore, and the position of the dam in regard thereto, the current tends to strike the dam at an angle and with great velocity, due to the rapids above. The water approaches the headrace—which will be made of very much greater capacity than would be actually required were there no anchor ice to contend with—at a very great velocity, and continues thus over the overflow of the dam, carrying with it the floating anchor ice. The water thus moving into the headrace at a slow speed, creates no suction and carries no anchor ice with it, the result being that a sort of water-dam will be formed at the intake.

Tenders are already being asked for the construction of the work.

CORRECTION.

Editor CANADIAN ENGINEER:

SIR,—With reference to my article entitled "Screw Steamer and Steel Tow-Barge Efficiency," which appeared in your last number, I find that by a clerical error the diameter and stroke of cylinders of the "Pathfinder" are expressed in feet instead of inches. Please note that her cylinders are 23, 37 and 62 inches diameter, respectively, and the common stroke of piston 42 inches.

Respectfully yours,

JOSEPH R. OLDIAM.

Cleveland, O., May 15th, 1895.

DEATH BY FIRE.

Editor CANADIAN ENGINEER:

SIR,—It is generally conceded that few, if any, more horrible forms of death can be endured than that by fire.

In ordinary cases death comes after protracted illness, when the vital forces have been greatly exhausted; but death by fire has mostly for its victims the wage-earning men and women, who in their full vigor are slowly or rapidly roasted, or else, should they jump to save themselves, in many instances die an agonizing death from injuries sustained, or, if they survive, go through life permanently injured.

My purpose, in this letter, is to draw attention to the criminal carelessness, or want of humanity, shown by many employers in their care of their employees, and to ask "those in authority" to see to it that no firm be permitted to erect or occupy a factory that is not fully equipped with fire-escapes—which is the exception at present—and further, that once in three months fire-drill be made compulsory, so that we may have less of the sad details to read which invariably follow as the result of large factory fires.

Without fire-drill, the best fire protecting devices may fail; an ample proof for this statement being found in the fire which recently took place in McDonald's tobacco factory.

Employers and all "those in authority" in the matter referred to, should remember that by the crime (for such it is) of knowing what is right to do and neglecting to do it, they contribute to the death of their fellows, and are truly responsible for such loss of life, and all the suffering it entails.

EBLANA.

Montreal, 27th May, 1895.

A CLEVER PIECE OF WORK.

Editor CANADIAN ENGINEER:

DEAR SIR,—Agreeably to your request, I send you a few details of the miniature engine referred to in the last number in the notes of Montreal Branch C.A.S.E. It was made by one of the firemen in the Board of Trade Building named James Willson, who has only had about two years' experience as such, and was never employed in any machine shop. The engine is of the horizontal type, with plain slide valve, and runs splendidly under steam, turning about five hundred revolutions per minute. There is no part of it that was made outside the boiler room, except a few small stove bolts. The diameter of the cylinder is $1\frac{1}{4}$ and stroke $2\frac{1}{2}$ in., and was made as follows: He first made a wood pattern for the cylinder and steam chest, and then moulded it in a mixture of Portland cement and sand, which was then set away to dry; this being done, a quantity of old lead, or rather tea chest lining, was melted up in a plumber's pot, and the cylinder was cast complete in every respect, with its lugs, flanges, steam and exhaust ports, etc.; the valve was also cast of the same material, but on the first steam trial it stuck so firm to the face that the eccentric rod pulled out. Not to be outdone, he then covered both faces with sheet brass thoroughly soldered on, then filed and ground them to fit steam tight. For a main shaft he cut a few inches off the engineer's brass packing hook. The fly wheel is made of lead, he having taken the wheel off one of the steam valves and used it for a pattern. The main bearings are made from pieces of an old electric light switch. The guides are made from some other scrap.

The engine was then mounted on a portion of a marble tile which had been thrown out. The cylinder was then covered with asbestos wool and laid with narrow strips of pine, which are held in place by neat brass bands. The only tools used in all this work were those usually found about an engine room, supplemented with an old razor and a pocket knife. All those who have seen it are surprised to see such good work turned out under the above conditions. It is really wonderful. Wishing your paper every success,

JOHN J. YORK,
Supt. and Chief Engineer,
Montreal Board of Trade Building.

Montreal, May 31, 1895.

A POINTER ON SAFETY VALVES.

Editor CANADIAN ENGINEER:

SIR,—Re Mr W. G. Blackgrove on "Safety Valves": For the benefit of your readers, I wish to correct an error under which this gentleman labors, as many others have done before him; this I pointed out in an English mechanical journal many years ago.

Mr. Blackgrove states as follows in his winding-up paragraph on safety valves: "Sometimes the lever is extended backwards beyond the fulcrum and fitted with a small weight at the end, so