Treatment.-The piles shall be treated with not less than 16 pounds best dead oil of coal-tar per cubic foot. Sufficient percentage must be allowed for outside drainage when drawn out of the cylinders. To be subjected to heat by live and superheated steam, not over 250° Fah.; heat to be continued long enough to reach the centre of the timber. Vacuum to range between 22 and 25 inches. Heat above the condensing point shall be maintained in the cylinders during the vacuum and throughout the treatment, so that there shall be no condensation whatever at any stage of the process. Vacuum to be continued until the discharge from the pump shall have no odor or taste of turpentine, and kept up until the cylinders have been filled with oil. The oil in the gauge-tank connected with the force-pump to be measured at a temperature of about 125° Fah., which temperature should be maintained during the treatment. The vacuum in the cylinders must not be so suddenly produced, nor the temperature raised so high as to cause cracking or splitting of the timber. Cylinders to have proper outlets to free them from all gases before the pressure is applied. Pressure to be continued until the requisite quantity of oil has been injected into the timber. Water must not be admitted into the cylinders, nor allowed to accumulate in the upper part of the cylinders over the Proper gauges to determine the amount of oil oil. used, to be furnished. The piles shall be selected, and those having the same amount of seasoning, texture and density placed in the cylinder together, so that the penetration may be uniform. With every charge a test block shall be placed on the top of the load, which block will be afterwards split, and the penetration ascertained by the Inspector. The block should be 31 feet long by 12 inches in diameter, and as near as possible of the same degree of seasoning and texture as the piles forming the charge. The piles, creosote and treatment shall be subject to close inspection at the works and before shipment, and the whole of the materials and workmanship must be to the entire satisfaction of the Inspector. A chemical analysis of the oil must be furnished if requested.

PUBLICATIONS CONSULTED IN THE PREPARATION OF THIS PAPER.

"American Woods," by R. B. Hough, 1896.

"Forest Wealth of Canada," by Geo. Johnson, 1895.

"Antiseptic Treatment of Timber," by J. S. Boulton, 1884.

"Report of Committee of Am. Soc. C. E ," 1885.

I am also indebted to the following gentlemen for valuable information :

Geo. S. Valentine, manager, Eppinger & Russell, Creosoting Works, New York.

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A. S. Martin, manager, Old Dominion Creosoting Works, Norfolk, Va.

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H. S. Haines, of the Plant R. R. and Steamship System.

B. T. Burchardi, chief engineer and general manager, Fernandina Oil and Creosote Works, Fernandina, Fla.

H. J. Mackenzie, C.E., Creosoting Inspector, Moncton, N.B.

## THE SIRIUS STEAM TRAP.

Editor CANADIAN ENGINEER.

While in England, I was shown a very ingenious and reliable steam trap, exceedingly small, and which can be fixed in any position. It is a new idea in expansion traps. I believe the principle employed is that of expansion and contraction; the construction is on a new principle avoiding defects common to other expansion steam traps. The requisite movement is obtained by the elongation and contraction of the extremities of a bent metallic tube, filled with a volatile liquid upon which the variations of temperature act, giving the required movement. The bent tube does not commence to move until the temperature of the imprisoned liquid has sufficiently raised to cause it to completely fill the internal vacuum; until then it remains inactive.



THE "SIRUS" TRAP, WITH COVER REMOVED.

T. Is the bent hollow spring tube. B. The cast iron case. E, Spring. S. The valve. V. Regulating screw. The spring is used only as a means of holding the expansion tube securely on to its pivot. Each trap is so regulated that at starting the valve remains wide open until the steam actually arrives, and all air and water expelled, the expansion tube acting and closing the valve at a temperature of  $212^{\circ}$ . The moment that condensation again sets in and the temperature of the tube is below  $212^{\circ}$ , the tube at once contracts and allows the valve to open and let the condensed water escape. It is a very sensitive trap, sure in its action, and is made use of largely by engineers to govern their drip pipes.

W. M. WATSON, Toronto.

## WHAT MAKES BOILERS EXPLODE?

Editor CANADIAN ENGINEER :

SIR,-In thirty-three years' experience with steam boilers and engines, I have never had one collapse or explode under my care. No matter how a boiler gives out, it is generally said to explode, and this, too, by engineers. <sup>1</sup>This is decidedly wrong. A boiler, like a vehicle, horse, or man, can only carry a load in proportion to its strength; anything over that will cause it to give way in its weakest points, or collapse altogether. It is possible, too, to overload the safety-valves and cause the destruction of the boiler, but neither of these is an explosion. There must be some ignitable matter in a boiler before an explosion can occur. I believe. When the water is allowed to get low in a steam boiler, a combustible gas forms within, and on turning on the steam the pulsations of the engine beget a friction which ignites this gas, and an explosion is the result. To avoid sudden expansion or sudden contraction, a boiler should not be blown out while it or the brickwork is hot : the boiler should be allowed to cool down gradianly, and the water run out in the same way. When a boiler is blown out empty, the heat leaves so suddenly, and the cold air strikes it so suddenly in return, that some parts stand expanded, while others contract, thus rendering it liable to collapse at any time. No engineer should depend entirely on the water glass of a boiler-the try cocks should be his guide. I believe in the system adopted in Toronto of having every boiler under inspection and under insurance. Yours truly,

## 65 Berkeley street, Toronto.

## G. W. SPROULE.

[It is of interest to read in connection with our correspondent's letter the following extract from the Locomotive: "Chief Engineer Quinlan and Assistant Engineer McCormack were seriously burned on February 17th, by an explosion on the United States Government dredge "Seneral C. B. Comstock," at Galveston, Texas. They removed a hand-hole plate from one of the boilers, and held a light to the opening to examine the interior, when a violent explosion occurred. An inflammable vapor of some sort was evidently present, but whether it was generated from benzine that had been used in getting the boiler ready for the regular Government inspection or not, we cannot say. It is possible it was caused by the use of kerosene as a scale preventive, for it is frequently employed for that purpose. Most oils in use are hydrocarbon oils, which generate a vapor, when mixed with air, which is highly explosive. Every boiler should be thoroughly drenched with a hose before going into it or introducing a naked light."--ED.]

THE Moncton Manufacturing Co., Ltd., applies for a New Brunswick charter to manufacture agricultural implements and machinery. Capital, \$60,000. The applicants are: E. C. Cole, J. L. Harris, C. W. Robinson, H. A. Whitney, Moncton; J. E. Riley, of Omaha, Nebraska; C. P. Harris, D. I. Welch, Moncton; J Abrams, Apohaqui, N.B.; R. A. Chapman, Moncton.