To Heat Metal Ladles.—The swinging stand or hinged idea is used here as in the open hearth auxiliary arrangement. Thus it can be lowered into the ladle, the long nozzte reaching clear to the bottom and thoroughly heating and drying the entire ladle.

^{Cil} Burners in the Brass Foundry.

One of the largest electrical manufacturing companies in the country states that number 70 Dixon crucibles which lasted only seventeen or eighteen heats when coke was used as fuel, now lasts from thirty to thirty-two heats since the oil burners were installed in the foundry.

The same company states that the cost of fuel has been cut in half and that the annoyance, dust and expense of handling ashes has been entirely eliminated. It is interesting to note that although a brass foundry was originally built for coke, it can be easily piped for oil burners. One of the manufacturers of oil burning apparatus offers the free service of their engineering department in designing the complete layout for any foundry, showing the application of the oil burners, if the owner will but submit a sketch of the present equipment.

The writer has been much interested in chatting with the various manufacturers who have adopted oil for a fuel, and was pleased to note the general satisfaction which follows its adoption. The quiet and unostentatious development of any line of enterprise often gains a far greater lead than is generally supposed. The author is glad to be able to present to the various applications of this particular line of thought, to the engineering public, i.e., the readers of this publication.

CONCRETE RETAINING WALL.

The Canadian Pacific Railway is now engaged upon the construction of the second and last portion of an extensive reinforced concrete retaining wall along a portion of the harbor of Montreal. The wall extends along the shore end of the docks, beginning near the company's elevator and passing eastward to where the company's lines leave the harbor front and curve towards the north. The wall is being given a height of from 21 to 25 feet. It retains the bank along which pass the trains operating between Place Viger Station and the stations east and north of the city, and it replaces the cedar crib work which for many years past performed this important service. The work of replacing the cedar crib work was begun a few years ago, and a portion of the permanent wall was constructed of



Face of Wall with Lagging being removed.

limestone masonry. The present reinforced concrete work begins a little below the company's elevator and extends a Limestone masonry then extends to the jail ramp, at which point the concrete wall again begins and extends some 2,100 ment. The first portion of the work was finished some time of months. The wall has a perpendicular face. Buttresses, at eight foot centres. The wall has a minimum thickness one foot under the coping. The base slab has a depth of two feet, extending the whole length of the wall, and a width of about 15 feet, widening or narrowing to conform to the height and batter of the buttresses. Expansion buttresses occur every 300 feet. These are 2 feet 6 inches wide, the other buttresses being 18 inches. The expansion buttresses are made with a 15-inch key, extending partly into the face and partly into the buttress. In constructing these expansion joints the end of the buttress in each section is allowed to set in the form, after which the form is removed and the concrete covered with tarred paper before the next section is started against it. Owing to the key, movement in contraction and expansion only takes place longitudinally.



Showing Junction of Limestone Wall and New Concrete.

The face wall extends downward as described to within 2 feet 6 inches of the top of the foundation slab, when the batter widens out in front and rear to form a bevel foot with a base of 3 feet 9 inches more than the face of the wall. A double row of weep-holes appear in the face, one row being a foot above ground and one 2 feet 6 inches below. At five feet below ground there is a longitudinal tile weeping drain to carry off the saturation and the flow from the lower row of weep-holes.

In the chambers between buttresses there is a rock filling, the rock being about 2 feet 6 inches thick, and extending all the way up. The mixture used in the base is 1:3:5, that for the face of the wall and the buttresses being 1:3:4, $\frac{3}{4}$ -inch stone being employed. The reinforcement used in the base is smooth, square bars, while for the face of the wall and for the buttresses Johnson and Kahn bars are used.

First is laid a 3-inch layer of concrete, after which comes longitudinal and cross bars. Then comes 17 inches of concrete, followed with another row of iron. Four inches of concrete finishes the slab. Forms are then put on to form the bevelled foot, 2 feet 6 inches high. From this up to the top the forms are put on in 4-foot lifts. The group of reinforcement consists of seven 1-inch and three 1¼-inch bars running along down the rear of the buttresses and hooking around the bottom row of longitudinal bars in the base. In the buttress are four ½-inch vertical rods, and ½-inch rods are also placed vertically in the face of the walls at 2-foot centres. A pair of ½-inch bars are hooked into the longitudinal face bars and run back to the rear of the buttresses at each foot in height.

As to the amount of concrete employed, it is estimated that the 25-foot sections run approximately three cubic yards and the 21-foot sections 2.5 cubic yards per lineal foot. In appearance the wall is not only massive but pleasing, a 3-inch coping being employed and the surface being smooth and well finished.

The United States Department of Agriculture has printed a circular, No. 151, on "The Preservative Treatment of Loblolly Pine Cross-arms." This bulletin contains a great deal of useful information on this important subject and is accompanied by numerous tables and curves giving theresults attained.