

FIG. 1. LIVERPOOL MARINE RAILWAY.

they are promptly sent home; and if a Canadian vessel becomes disabled in a U.S. port, and goes on a U.S. drydock, the owners have to pay duty on those repairs before she leaves."

Speaking of government aid to the shipbuilding industry, Mr. Long pointed out that a large amount of public money has been given to railways, but nothing to aid steamboat transportation. Shipbuilding has not received any encouragement from either provincial or federal governments. A large amount of the carrying trade of the country is done by vessels, and the facilities provided by private capital have not been aided in the least.

"In order to encourage shipbuilding the Government should give aid to shipyards," said Mr. Long, "and that aid should be based on the tonnage and the class of vessel constructed, in order to compete with U.S. and English shipyards, because all materials which go into iron or steel vessels are manufactured in the U.S. or Great Britain, and have to be brought here at a greater cost to Canadian builders than if taken to U.S. or English shipyards. The shipbuilding industry is just springing into existence in Canada, and skilled labor has to be imported. If the government subsidized shipyards it would give a great impetus to the industry. Any material, whether raw or otherwise, now going into the construction of vessels here, and not made in Canada, ought to be exempt from duty.

"I would not like to say," continued Mr. Long, "what the bounty ought to be, but I do think a bounty ought to be paid, whether on wood, iron or steel vessels. The inland marine is nearly depleted of Canadian bottoms, and there is a great need for the construction of Canadian vessels. If the shipyards were encouraged in the way I speak of, it would largely increase the number of Canadian vessels on the lakes."

Mr. Long also pointed out the need of drydocks for the inland marine. The only Canadian drydock on the upper lakes is the one at Collingwood. It has been built 18 or 19 years and has been a great public service, but, owing to the increased size and tonnage of vessels now being built, it requires to be enlarged to meet the present and growing requirements of the marine business. It would give accommodation to the ports of Parry Sound, Midland, Meaford and Owen Sound, and also to Lake Huron ports, if enlarged to meet present needs. The Collingwood shipyard has now on the stocks a steel steamer 326 ft. long by 43 ft. beam, which will have to go to a U.S. dock when repairs are needed.

Steel Shipbuilding in Canada.

This question is kept to the front in a variety of ways, and is being discussed from all points of view. Capt. McDougall, who is one of the directors of the Collingwood Shipbuilding Co., and who also builds whalebacks at West Superior, Wis., in a recent interview gave his views as to what were the necessary conditions that would have to prevail before

coastwise trade, while Congress has forbidden Canadian or any ships save those built in the U.S. to trade coastwise in U.S. waters. The only condition upon which a foreign vessel can come under the U.S. flag is by special act of Congress, or when it is wrecked on the coast of the U.S., and is repaired in the U.S. at a cost of more than three-quarters her value.

"If a U.S. vessel is repaired in Canada, she must pay 50% of this cost as customs duty at the first U.S. port she enters. Thus U.S. shipyards have protection for both building and repairing ships, while Canadians have little or no ship protection. The Canadian coastwise trade is freely open to all British ships, and British ship registers are open to all foreign-built ships, so that when a ship is wanted in Canada it can be bought in the U. S., with all its appurtenances, which belong to many branches of trade, and by a little red tape can be enrolled under British registry and hail from some British port by putting its name on her stern and buying a British flag. A Canadian vessel can get repairs in a U.S. port and pay but little customs charges for such repairs.

"The U.S. Government further protects its Pacific coast shipyards, by allowing a large percentage in favor of Pacific coast shipyards when tendering for Government work, and at present there are U.S. Government ships under contract at San Francisco and Seattle at prices from \$100,000 to \$200,000, more than they could be built for on the Atlantic coast. In Canada, when Government ships are wanted, bids are asked for in Canada and also in Great Britain; the details of their specifications and fittings are of a class such as can only be got in Great Britain, and the Canadian shipbuilder would have to pay duty on these parts. Unless the Canadian is the lowest bidder the contract is let to an outsider, who can get the ship built in Great Britain, Germany, the U.S. or elsewhere. Thus an industry which, with its great quantity of raw material, Canada is peculiarly fitted for, is hampered, and the heavy traffic along the frontier is carried by ships not made in the Dominion. If some restriction were laid upon British ships and foreign-built ships of English register engaging in the Canadian coastwise trade; if the Canadian Government would pay a small bounty on all steel ships built in this country, and if an increased customs duty was charged on repairs to Canadian ships in foreign ports, steel shipbuilding here would be so stimulated that in the near future steel ships might be sold

Canada would be able to compete with Great Britain or the U.S. as a shipbuilding center. He said: "Steel shipbuilding in Canada cannot be a great success until some protection is given against the evils now existing. In the U. S. where there is cheap steel many shipbuilding yards, encouraged by protection, are now selling ships for Canadian

with their cargoes in foreign countries, as formerly wooden ships, built in Quebec, were sold all over the earth."

Marine Railway Electrical Equipment.

An interesting electrical installation of somewhat novel character has been made recently at Liverpool, N.S. It was devised for hauling vessels out of and lowering them into the River Mersey, a distance of over 500 ft. on an incline having a grade of half an inch to the foot. Some years ago the Liverpool Marine Railway Co. had a slip of this kind in operation, whose motive power was horses. A framework carried two horizontal gears attached to which was a beveled gear with a vertical shaft projecting upward, and working on this were two long arms or sweeps. To these were hitched two or four horses traveling around on an upper platform, which was reached by a runway outside the building. This animal power was, of course, limited in its capacity, and extremely slow, it taking three to four hours to haul up a small vessel in the cradle. While the vessel was undergoing repairs, it was held from running back by a great dog in a ratchet. When the work was finished it was the custom to knock out the dog and let the cradle go "by the run" back into the water. This crude method soon wrecked the cradle and the track as well. The result was that the whole plant fell into disuse and decay.

During the past year a new company was organized with the object of rebuilding and equipping the slip in an up-to-date manner, and when it came to the question of the best power it was decided to use an electric motor, there being, moreover, a lighting system in town driven by water power, from which the current could be obtained very cheaply. A 30-hp. induction motor has been installed, which will raise and lower ships of a burden up to 400 tons, over a track which is 600 ft. in length, in the remarkably quick time of 25 minutes. The equipment has so far proved a very economical and highly satisfactory investment. The motor is geared to a worm, which in turn operates a further train of gears, as illustrated in figs. 1 and 2 herewith. On the shaft of the large and last gear is a sprocket which engages an endless two-inch chain that hauls the cradle. The whole thing is as simple as possible. It will, of course, be understood that the gears and sprockets are within the frame and not outside, and it may be added that the frame is much heavier than shown. It was found feasible to use much of the old gearing. The framework

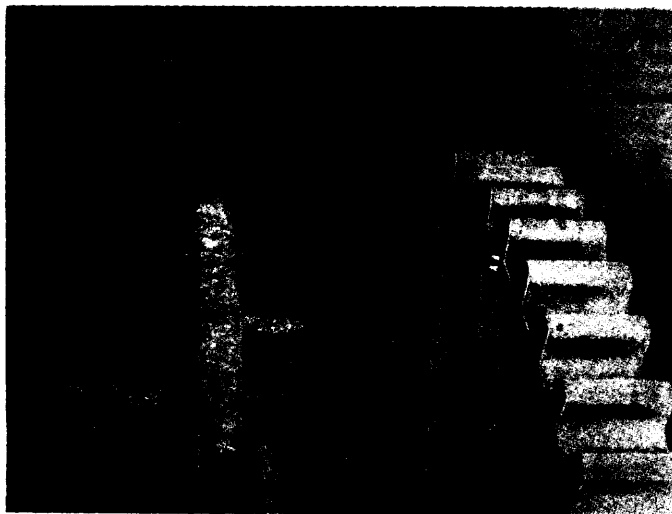


FIG. 2. LIVERPOOL MARINE RAILWAY.