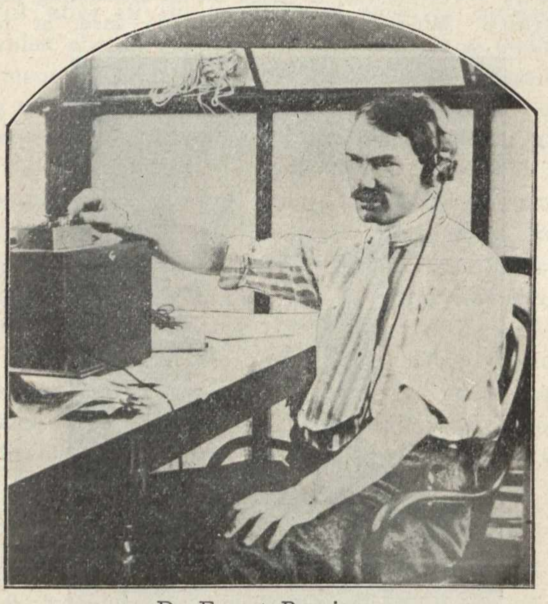
narrow opening called a spark gap. When the key is held down, electrical oscillations or waves are automatically discharged from the condenser across the spark gap into the upright wires. These oscillations are very rapid, running about 120 a second. When released from the upright, or sending wires, they travel with the velocity of light, which is 186,000 miles a second. Dots and dashes are produced by manipulating the key. Each dot is made up of many oscillations, but they are so close together that all that can be distinguished is a sharp crack. Dashes are made up of so many more oscillations that they sound like a roar. Oscillations from the sending wire induce similar oscillations in any similar upright wires they encounter. These induced or sympathetic oscillations at the receiving wire break the current in the anti-coherer or responder, which the de Forest system employs as its receiving instrument. The current in the responder flows through a fluid conductor composed of oil and water. When the electrical waves from the sending station shoot down the wires at the receiving station into the responder they generate gas bubbles in

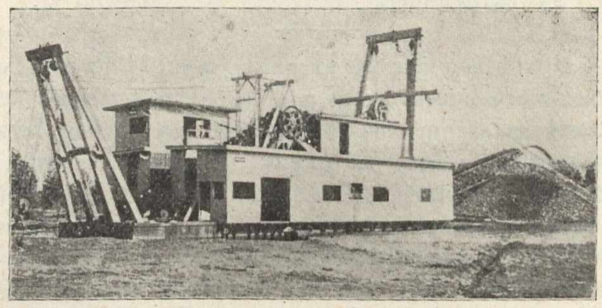


De Forest Receiver.

the fluid. Being non-conductors, these bubbles interrupt the local current, and repeat the dots and dashes released hundreds or thousands of miles away. A telephone receiver is connected with the responder, and the operator hears the clicks produced by each wave. The dots come in as a short series of clicks. They are easily read. It is in the anti-coherer or responder that the de Forest system differs particularly from the Marconi system.

ELECTRIC DREDGE FOR ATLIN.

A new development in the Atlin District in British Columbia is the introduction of gold dredges. A dredge of this class is being built by the Western Engineering and Construction Company, of San Francisco, and will be operated entirely by electricity. The power wi.l be generated by water, and at a point two miles from the dredging ground, and will be transmitted by wire. The dredging machine proper will be similar to those in use in the Oroville District in California. The machinery includes buckets to take the material from the bottom, a steel copper into which the gravel is emptied, revolving screens, a separate chute for carrying off large stones and boulders, and a sluice-box for saving the gold. The stone-chute will be of sufficient height and inclination to discharge the material clear of one side of the boat, so that no obstruction can take place on account of the accumulation of tailings. The fine material will be carried off at first by sluices extending over the stem of the dredge. A tailings elevator will be provided when it becomes necessary to stack the tailings at a greater distance from the bolt. The Atlin gold is generally coarse and easy to save, but the dredge will be provided with finer screens and gold-saving tables, to be used if it should be found necessary. The machinery for this dredge will be carried by steamer to Skaguay; then by the White Pass and Yukon Railway to Caribou; by teams to Tagish Lake; across that lake by steamer and then on the narrow-gauge portage road to Atlin Lake, where a steamer will carry it to its destination. The season in Atlin is very short, and work is being rushed with the expectation of having the dredge in operation by next July. The utilization of water-power through the medium of elec-



Electric Dredge for Atlin.

tricity will be of special advantage in Atlin, where fuel is scarce. The electrical equipment, which is supplied by the Westinghouse Electric and Manufacturing Company, includes two 180-K.W. belted alternators, which are to be driven by waterwheels; two type F, variable-speed induction motors, with controllers; two standard type C induction motors for driving the pump, one of 20-h.p., and the other of 50-h.p., and a 15-h.p. type C motor for operating screens.

STEAMBOAT ENGINEERS FOR THIS YEAR.

The following engineers have been appointed to the vessels named, in addition to those mentioned last month: Steamer Paliki, Arthur E. Foote; str. Theano, Richard McLaren, second engineer; str. Midland Queen, J. G. Fisher; str. Midland King, E. Abbey; str. Lord Stanley, John Nesbit; str. Hiram Dixon, R. Grierson; str. King Edward, Samuel Beatty; str. Tionesta, L. Smith.

PIG IRON PRODUCTION IN CANADA.

The production of pig iron in Canada for 1902 shows an increase of 74,581 tons, or over 30 per cent., as compared with 1901. The total production in 1902 was 319,557 tons; in 1901, 244,976 tons; in 1900, 86,090 tons. Of the production in 1902, 302,712 tons were made with coke, and 16,845 tons with charcoal. The basic pig iron was a little over one-third of the production, namely, 107,315 tons and bessemer iron 9,000 tons. Spiegeleisen and ferromanganese have not been made since 1899. On December 31, 1902, Canada had 14 completed furnaces, 7 in blast and 7 idle. Of these 9 were equipped to use coke, 4 to use charcoal, 1 to use mixed charcoal and coke. In addition 4 coke and 2 charcoal furnaces were built or partly built.

The following table gives the total production of all kinds of pig iron (including spiegeleisen and ferromanganese) in Canada from 1894 to 1902. The figures are in long tons:

1894	44,791	1899	94,077
1895	37,829	1900	86,090
1896	60,030	1901	244,976
1897	53,796	1902	319,957
1898	68,755		

On December 31, 1902, the unsold stocks of pig iron in Canada amounted to about 20,000 gross tons, as compared with 59,472 tons at the close of 1901 and 12,465 tons at the close of 1900. The above figures come direct from the manufacturers, as given to the American Iron and Steel Association.