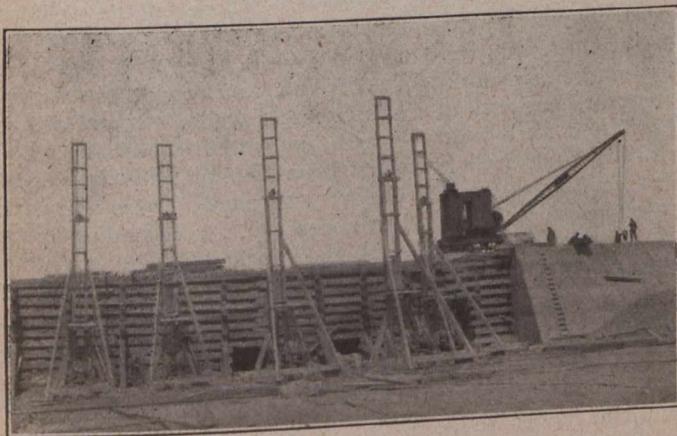


and  $2\frac{1}{4}$  ft. high. On top of these are placed temporary hard-wood timber blocks to obtain the required height above the floor. It had been intended to build bilge blocks so arranged as to slide under the bilge of vessels. However, this was objected to by the British Admiralty, which insists on having all blocks made of the same pattern, so as to enable building a bed that will conform to the bottom of the vessel.

### Caissons

The outer entrance is closed by a rolling caisson built of steel and operated by an electric motor of 125 h.p.; the bottom is provided with two heavy scantlings of steel, resting on flanged rollers, 3 ft. in diameter, placed at 8 ft. centres. These are made of cast steel and bored to receive bronze bushings. The forged steel spindles, 4 ins. in diameter, are also provided with bronze sleeves. The cast iron casings, containing the rollers, are set in the concrete altars, on each side of the caisson berth and chamber. At an elevation of  $15\frac{3}{4}$  ft. above the sill of the dock the rolling caisson is provided with 6 culverts, 42 ins. in diameter, closed by sluice valves that are operated from the upper deck by a 15-h.p. electric motor, driving a longitudinal shaft provided with the necessary gearing; and, by means of clutches, any one or all of the valves may be worked. The culverts are used for flooding the dock. The caisson is divided horizontally by a water-tight deck at the elevation of  $23\frac{1}{2}$  ft. above the bottom, forming the ballast and tidal chambers. As the tide rises the sea water comes on this deck through valves in the outer face of the caisson, which are kept constantly open during the summer to prevent the caisson from floating. A sufficient quantity of ballast is provided, so that the total weight of the structure resting on the rollers is approximately 150 tons. During the winter, when the dock is not in operation, the lower or ballast chamber of the caisson is filled with water, which is kept from freezing by a constant jet of steam. The tidal chamber is then kept dry by closing the valves. The caisson is closed and opened with heavy chains, supported on altars on each side of the caisson



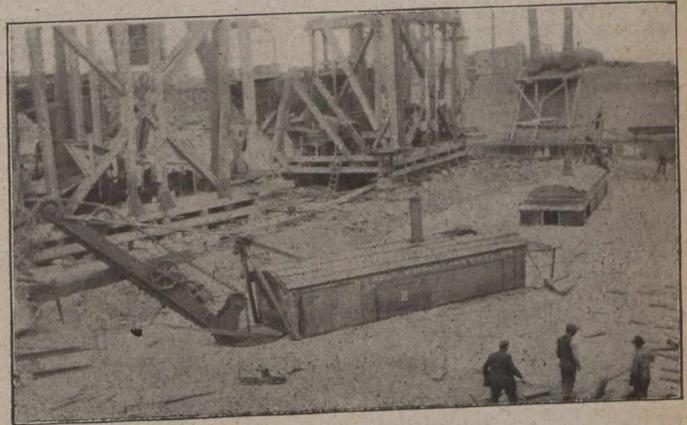
First Drilling in Front of Temporary Cofferdam

recess, and passing over pulleys worked by worm gears connected with the motor. The top of the caisson is provided with a folding bridge for light traffic across the dock; as soon as the caisson starts to open, the apron and railings of the bridge are automatically lowered to allow them to pass under the flooring over the caisson recess. The middle entrance of the dock is closed by an ordinary floating or ship caisson. When in place, the deck is used as a bridge across the dock. This caisson may also be used to close the outer entrance by placing it immediately outside the rolling caisson, where the necessary stop is

provided for it. This, however, will be necessary only in cases of repairs being required to the submerged parts of the rolling caisson. These caissons were built by the Dominion Bridge Company, under a sub-contract.

### Boilers and Electric Power

Six water tube boilers of 500 h.p. and two of 300 h.p. furnish steam at 200 lbs. pressure to produce electric cur-



Start of Excavation Near the Temporary Cofferdam. Shovels Drowned by Infiltration

rent. The boilers are provided with automatic stokers, ash and coal conveyers. The coal is unloaded from cars into a coal crusher run by an electric motor, and elevated to a hopper of 500 tons capacity, over the front of the boilers. Water heaters are provided, but the steam is not superheated; one of the small boilers will be constantly under steam pressure to run the drainage pumps and the lighting dynamo. The electric power consists of 3 direct current turbo-generators of 550 volts, one of 1,500 kilowatts, one of 750 and one of 300 kilowatts. The steam turbines are of the Curtis condensing type, built by the General Electric Co. In the large unit the turbine runs at 3,600 r.p.m. It is geared down to 360 revolutions for the generator; the second is geared from 5,000 to 750; the third is geared from 5,000 to 900 r.p.m. A 100-kilowatt generator driven by a high-speed direct connected steam engine, furnishes the current for lighting purposes. This power installation is more than ample for all the machinery connected with the running of the dock proper. It is, however, anticipated that the whole of it will be used when large repairing and shipbuilding shops are in operation together with the pumping of the dock.

This electric installation has been criticized, on the ground that the large expenditure is not justified when electric current is available from private companies in the vicinity of Quebec. When the electric installation was proposed by the writer the idea in view was that no company would be interested or willing to furnish over 3,000 h.p. at any time of the day or night for the short period of about 50 hours in the year without interfering seriously with their general service. It had also been ascertained by personal visits to five of the principal U.S. Government navy yards that each of them has provided its own electric power for pumping their dry docks. Out of five, only one had installed alternating current machinery. It has developed since that the only electric company that could furnish the power current is not willing to entertain the proposition unless at a much greater cost to the government than the private installation can be run, including the interest on the outlay, which is approximately \$240,000.