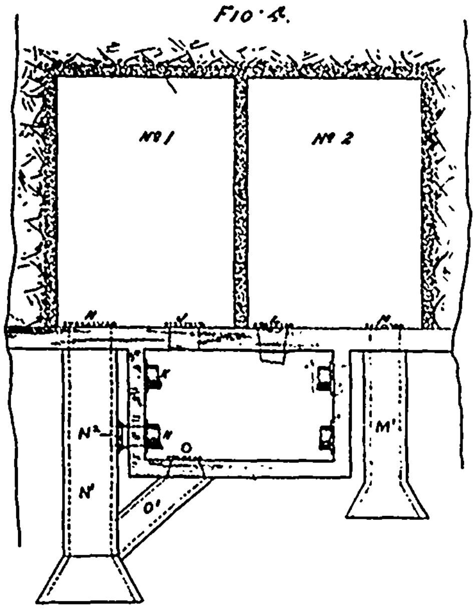
Fig. 4.



This invention will be best understood by describing the same with aid of the accompanying drawings.

Figure 1, plan of the entire means according to this invention.

Figure 2, sectional view on line X, Y.

Figure 3, sectional view on line X¹,Y¹, looking towards the tidal way.

Figure 4, partial view of Fig. 1 with modification.

According to this invention I employ one or two reservoirs of dimensions suitable to the power required, numbered for convenience of reference 1 and 2; the bottoms of these are placed at different levels to enable the rise and fall of the tides to be utilized during every twelve hours to drive turbines as hereafter described. I will proceed to describe the invention with reference to two reservoirs.

The bottom A of No. 1 reservoir may be on a level with the top of the water B, of the tidal way at low water; and the bottom C of No. 2 reservoir about the top of the water at half tide high. I propose to explain the invention dealing with a tidal rise and fall of twenty one feet.

The wall D of the reservoirs facing the tidal way is provided with a turbine race E, which shuts out the tidal water. In this race are arranged the turbines F, F¹,F². The drawings show three turbines, but more or less may be employed. These turbines are held to be about three feet above the level of the bottom A, of No. 1 reservoir. At this level there is a sluice valve G, opening into the tide water. This valve communicates with a feed tube H, for the turbines when the latter are being worked by an inlet of water from the tidal way. The turbines empty into the bottom of the race E, from which there is a communication into No. 1 reservoir. This communication is closed by a sluice valve J. The capacity of this reservoir should be such that the water running in from the race E, should never rise above the level of the turbines. On the other side of the turbines is another feed pipe K, to receive the water from No. 2 reservoir. The communication from the latter reservoir to the feed pipe is controlled by a sluice valve L. The working is as follows: As the turbines are placed three feet above low water level, a tidal rise of 21 feet will give the turbines at high tide a head of water of 18 feet. At high tide No. 2 reservoir is full of water which has come in through the sluice M, then the latter is closed. At this time No. 1 reservoir is empty. The tide will rise 3 feet 6 inches per hour. Working begins at high tide by letting the water in from the tidal way for one hour and three-quarters, which, after passing through the turbines, empties into bottom of race E, and runs into reservoir No. 1, through the sluice way J. During this hour and three-quarters working the tide will have lowered 6 feet 1½ inches, leaving 11 feet 10½ inches of water head. The tide water will now be shut off by closing valve G; and the sluice L of No. 2 reservoir opened and the water taken from this reservoir for three hours, which runs into feed pipe K, and from thence through the turbines as described into No. 1 reservoir. The tide will have lowered in 4¾ hours 16 feet 7½ inches. For the next 1¼ hours the water is continued to be drawn from No. 2 reservoir, but empties out into the tidal way. It will now be low tide when the sluice N, of reservoir No. 1, is opened and the reservoir emptied of its water into the tidal way, and any water in the turbine race can be also run out though the sluice O. The turbines continue working with water from No. 2 reservoir for a further 1¼ hours, the water running into the tidal way, when the tide will have risen 4 feet 4½ inches. Working is still continued from No. 2 reservoir for another three hours, the water running into No. 1 reservoir, making 4¼ hours since low tide. During this 4¼ hours the tide will have risen 14 feet 10½ inches. No. 2 reservoir is now shut off, and the turbines worked by water from the tidal way for 1¾ hours, the water being delivered into reservoir No. 1. It is now high tide again and No. 2 reservoir is once more filled for working.

By the above described means turbines can be worked day and night continuously by tidal water throughout the whole year, the capacity of the reservoirs being such as will receive and supply the requisite quantity of water necessary to work the turbines. To obtain nearly even power in working, I find it advisable to vary the size of the turbines, taking the smallest one with the highest head, and the largest with the lowest head. When the reservoirs are placed a distance inland I use pipes M¹ and N¹, from the reservoirs to the tidal way. The feed pipe H can be connected to the side of the pipe N¹, as shown at Fig. 4, and the outlet from turbine race by branch pipe O¹. When working with one reservoir only (No. 1), the working begins at half tide, the reservoir being then empty, and goes on for six hours from the tidal way, the water running into the reservoir. When the tide has fallen half way the working ceases, and at low tide the reservoir is emptied, and working recommences when the tide has risen half tide high."

For THE CANADIAN ENGINEER.

THE HAMILTON RADIAL ELECTRIC RAILWAY.

BY F. C. ARMSTRONG.

Of the various electric railway projects which have in Ontario during the past year advanced from the preliminary and paper stage into that of a completed or partially completed and operating system, the Hamilton Radial Electric Railway is easily the most important. The scope and nature of the undertaking is clearly indicated in the name of the company. The situation of Hamilton, thrust forward by its position at the head of Burlington Bay into the most fertile and populous part of Western Ontario, is especially favorable to the success of such a system of light electric railways, radiating from it as a centre towards the south-east through Beamsville, Grimsby and St.