

descent circuit being used, with stationary *water* resistance interposed to reduce the voltage.) The arc at the cathode narrowed down to a very fine point, never wavering, and remaining in the same place.

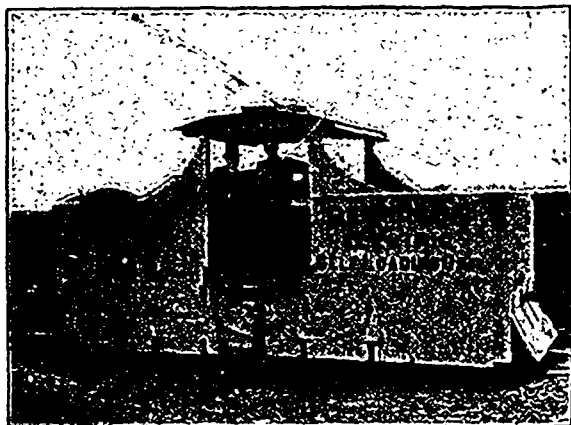
The field was increased to 500 c.g.s. lines, and the effects were only augmented, the rotation being more rapid, the noise louder and the resistance decreased until 14 amperes at 42 volts were passing. The field was then increased to 1,000 c.g.s. lines and the noise became a roar, the arc curled out and around the anode's outer edge, yet maintaining a point at the cathode; the current became 20 amperes at 34.5 volts; its rotation was no longer visible, and the points of light dispersed over the edge of the anode multiplied until it bore a resemblance to "stipple" work.

The positive carbon was then placed as shown in Fig. 2, and the arc started. While influenced by the field of 1,000 c.g.s. lines, the arc started around the anode until it reached the other side farther away from the cathode, making a line of the bright points mentioned; the distance between the electrodes being about three-eighth inch, the current from 10 to 14 amperes fluctuating rapidly, and the volts from 50 to 47.

No claim to accuracy is made, as the apparatus used was crude, and time was limited. Further investigations will be made, which will throw more light on the subject

REYNOLDS' ELECTRIC SELF-LOADING CAR.

There has been turned out of the car works of the Rathbun Co., of Deseronto, Ont., recently, an electric self-loading car, which is a remarkable specimen of mechanical ingenuity, and bids fair to work a revolution in the method of cleaning the streets of all large cities. This car is the invention of A. Jackson Reynolds, of Montreal, formerly of Worcester, Mass. A



brief inspection of this car, which is illustrated above, shows that it is 22 feet in length, 8 feet wide and 9½ feet high, very compactly and strongly built. It is fitted with the usual equipment of a trolley car. Contrary to general use, the brakes, motors, etc., are all situated above the wheels and axles, so as not to impede the full action of the brush. The operating platform on which the hands stand while directing the motion of the car and broom is 8 x 5 feet, and so placed as to protect them from being touched by the dust thrown from the revolving brush or broom. This large brush, which has been specially manufactured for this purpose, makes five revolutions to each one of the car wheels. It works much on the same principle as a carpet sweeper, and will throw the dust a distance of twenty-five feet, and will pick up thirty-eight cart

loads without stopping. The broom, which is fastened to solid heavy axles, is so arranged that it always fills the case in which it is contained, a simple device changing the size of the latter to suit the changes made by the wear of material. The broom acts as well one way as another, steel deflectors being so arranged that it can be run backward without any change of machinery. The action may be reversed instantly, so as to throw the dust one way or the other as may be desired. The broom may be extended so as to cover the whole street outside the car-track if necessary. For removing snow the car may be constructed as long or wide as may be required. For dumping purposes the floor is constructed in sections. The car can be unloaded in thirty seconds, one man doing the whole work by a lever. The inventor claims that this car will work a revolution. It not only sweeps the dust from the streets, but it conveys it outside the city, thus saving the labor of hundreds of men and horses. When, therefore, it is seen that five or six cars of this description can not only sweep the streets, but carry off all the rubbish, it is easy to see that a great saving of expenditure may be expected if it answers the expectations of its inventor. Mr. Reynolds informs THE CANADIAN ENGINEER that he has received an offer of \$50,000 for the right to manufacture and use these cars in Ontario. In operation the cars are used to clean the whole street except a narrow strip at each side from which the dirt is swept towards the tracks by the usual horse brooms. The car sweeper can be run as fast as seven miles per hour with good results, and at a cost of less than one dollar per mile.

THE DRY DOCK AT KINGSTON, ONT.*

BY HENRY F. PERLEY, M. CAN. SOC. C. E.

To provide for the repairing of craft on the Great Lakes, the Government of Canada in 1889 commenced construction of a dry dock at Kingston, Ont., which was brought to completion in 1892, the plans and specifications for which, excepting the details of the pumping plant and engine house, were prepared by the writer. After an examination of several sites had been made, that known as "Power's Ship Yard" fronting on the harbor, was selected, and purchased on reasonable terms. In addition to the property thus acquired, the lower portion of Union street, which had been closed some years previously under an arrangement for the construction of a dry dock, was ceded by the city to the Crown, which thus became the possessor of a frontage of 400 feet on the harbor, a frontage having deep water at but a little distance from the shore. The site is situated between Gore and Union streets, having the shops of the Kingston Locomotive Works on one side, and those of the Kingston Foundry Company on the other. When taken possession of, the site was encumbered with several buildings, the remains of an abandoned marine railway, an old wharf, and the work that had been executed on a proposed dry dock and abandoned, all of which had to be removed.

In determining the dimensions of the dock, it was judged that they should exceed by a small amount those of the locks on the Welland Canal, so that any vessel which could pass through them could be admitted to the dock, and a length of 280 feet on the floor and 48 feet width of entrance were adopted. During construction, representations were made that the width of the entrance was not sufficient to admit some paddle-wheel

* From a paper read before the Canadian Society of Civil Engineers.