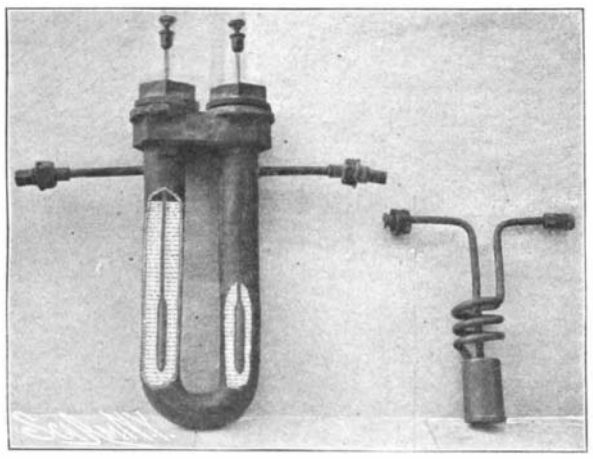
HOW LARGE STEAMERS ARE DIVIDED AND TAKEN THROUGH THE CANADIAN CANAL.

The construction of steamships and barges in yards on the Great Lakes, as is well known, has included a fleet built for the ocean as well as lake service. Some of these vessels are of very large dimensions, having a carrying capacity ranging between 4,000 and 5,000 tons, and equal in size to many "tramp" ships of the small class which are engaged in the Transatlantic trade. To bring these ships to the seaboard and through the Canadian canal system has required some interesting engineering feats; in fact, some ships are of such length that it has been found necessary to cut them into two pieces to allow them to pass through the locks of some of the small canals.



U-Tube with Electrode and Stopper. Worm Condenser.

MOISSAN'S APPARATUS FOR THE ELECTROLYTIC PRODUCTION OF FLUORINE.

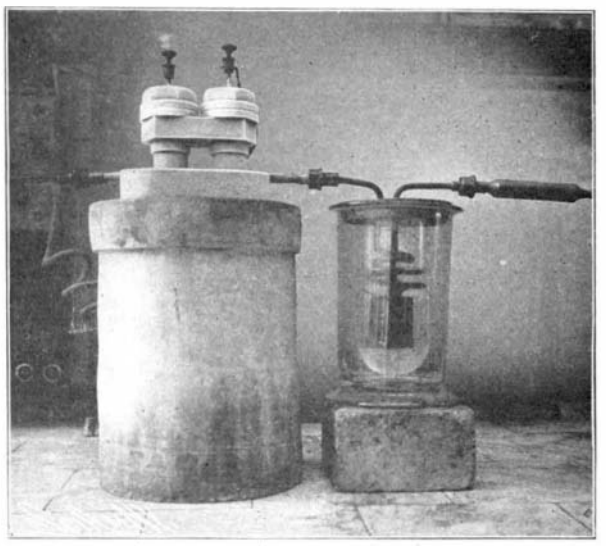
The American Shipbuilding Company at its Cleveland yard has recently completed several vessels intended for the American seacoast trade. As it was impossible to reach tide-water except by way of the Welland Canal and the St. Lawrence system they were planned with the view of being divided as stated. One of these ships, the "Minnetonka," recently made the voyage from Cleveland to the head of the St. Lawrence system. Here she was placed in a drydock and divided just forward of her engine room. The openings were filled with a bulwark composed of a framework of timber supporting heavy planks, the spaces between the edges of the plank being made watertight by caulking. The two sections were then taken through canals without difficulty, the rear portion being moved by its own engine and guided by the tugboat, the forward section of course being towed. In this manner the steamship was taken to Levis, Quebec, where the sections were placed in the drydock of Davie & Son and joined together.

In constructing the "Minnetonka," the hull plates as well as ribs were planned so that the division could be made with comparatively little expense, and but a few days were required to join the parts of the vessel. Owing to the method of construction the re-united hull is as stiff as if it had never been cut in two. The accompanying photographs show the vessel in sections passing through the canals, and just after the shell was joined together in the Levis dock.

PRODUCTION OF FLUORINE IN MOISSAN'S ELECTROLYTIC APPARATUS.

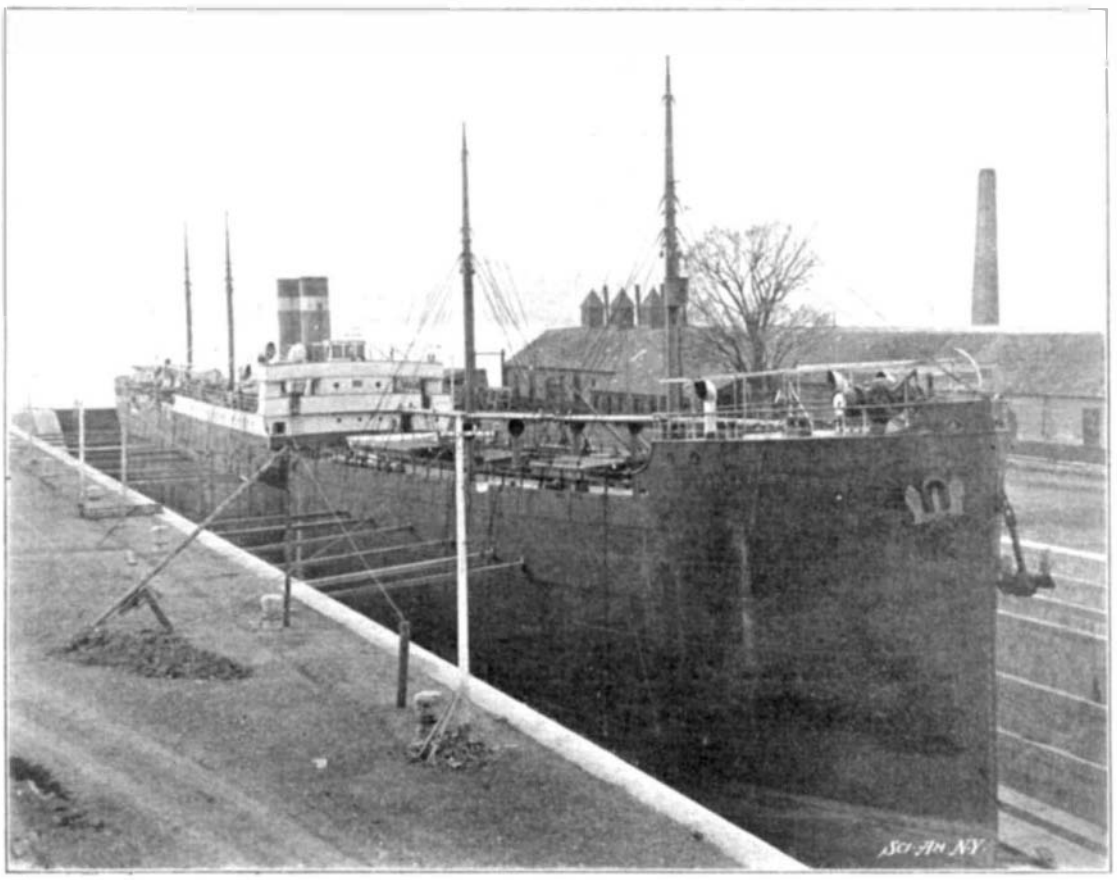
BY THE PARIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

Although the existence of fluorine has been long established, it is but recently that this element was set free by Prof. Henri Moissan in the gaseous state. It has been since liquefied by using liquid oxygen, and solidified by liquid hydrogen. M. Moissan produces fluorine gas by the electrolysis of pure hydrofluoric acid, to which a small amount of fluorhydrate of fluorine is added to make it conducting. The electrolytic apparatus is illustrated in the engravings. The electrolysis takes place in a large copper U-tube. Each of the branches is closed by a screw stopper formed of a copper screw which is bored out and has fitted into it a cylinder of fluor spar. Through the latter pass the long platinum rods which serve as the electrodes. Fluor spar is used to insulate the electrodes from the tube, as most other bodies are attacked by the fluorine. The stopper closes the top hermetically by means of a lead washer placed between the head and the top of the tube. The electrodes are enlarged at the lower part so as to resist the action of the electrolyte for a longer time. At each side of the U-tube is a small platinum tube for taking off the gases which are produced at each pole. In the first experiments, M. Moissan used a platinum U-tube, but as this is quite costly he looked for another metal and found that a copper tube would answer very well, as it is but little attacked. In fact

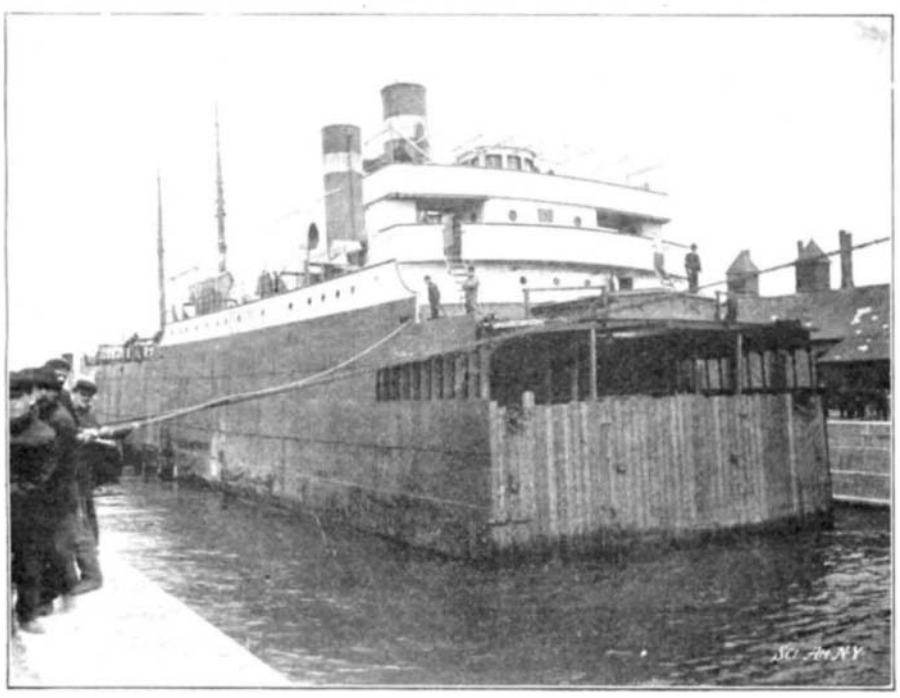


MOISSAN'S FLUORINE LIQUEFYING APPARATUS SHOWING U-TUBE COVERED WITH FROST.

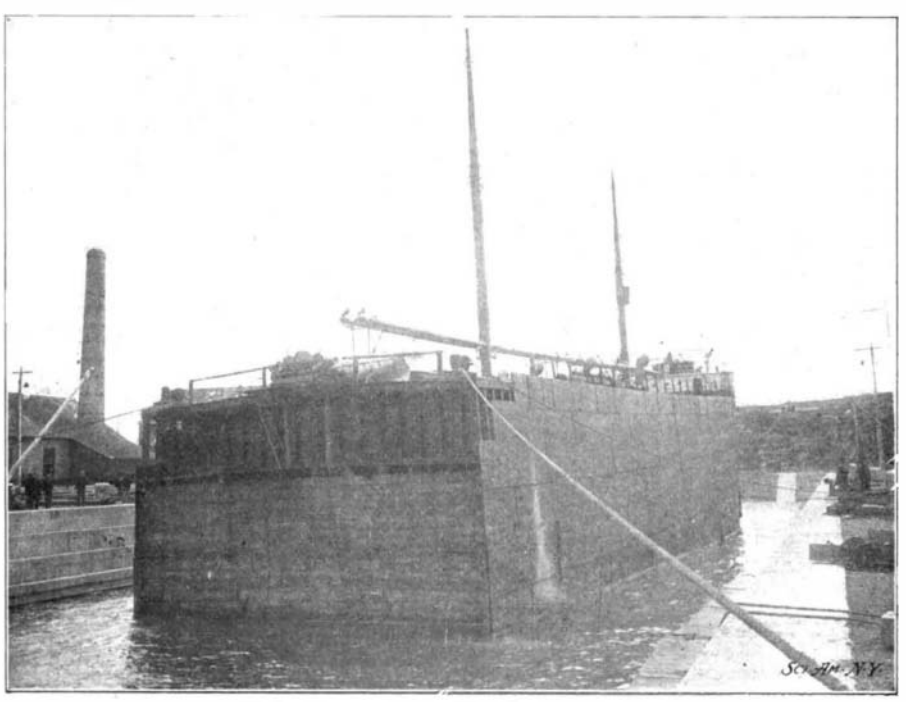
the fluorine which enters into solution produces a thin layer of an insulating fluoride of copper which thus protects the metal; but for this same reason copper electrodes could not be used, as the insulating layer stopped the passage of the current. The apparatus is placed in a vessel filled with chloride of methyl, which keeps it at a temperature of —23 deg. C. This is placed in an outer vessel containing fragments of chloride of calcium so as to surround the inner vessel with a layer of dry air, which is a bad conductor of heat. It was indispensable that the fluorine should be quite pure and free from vapors of hydrofluoric acid which might be drawn along at the time of its formation. To collect the vapors he uses a small worm-tube and condenser of platinum which is placed in a second vessel filled with chloride of methyl. Nearly all the hydrofluoric acid vapors are condensed here and remain in the lower part of the condenser, while any that might remain are absorbed by a series of platinum tubes placed at the end of the apparatus, containing pieces of melted fluoride of sodium which absorb them very energetically, and thus the fluorine gas comes out of the apparatus in a pure state. With a current of 50 volts and 15 amperes the fluorine is produced at the rate of 5 liters per hour, but the experiment cannot be made



The "Minnetonka," Docked, With Her Sections Rejoined After Passing Through the Canal.



The After Section of the "Minnetonka" Passing Through the Canal.



The Bow Section of the "Minnetonka."

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