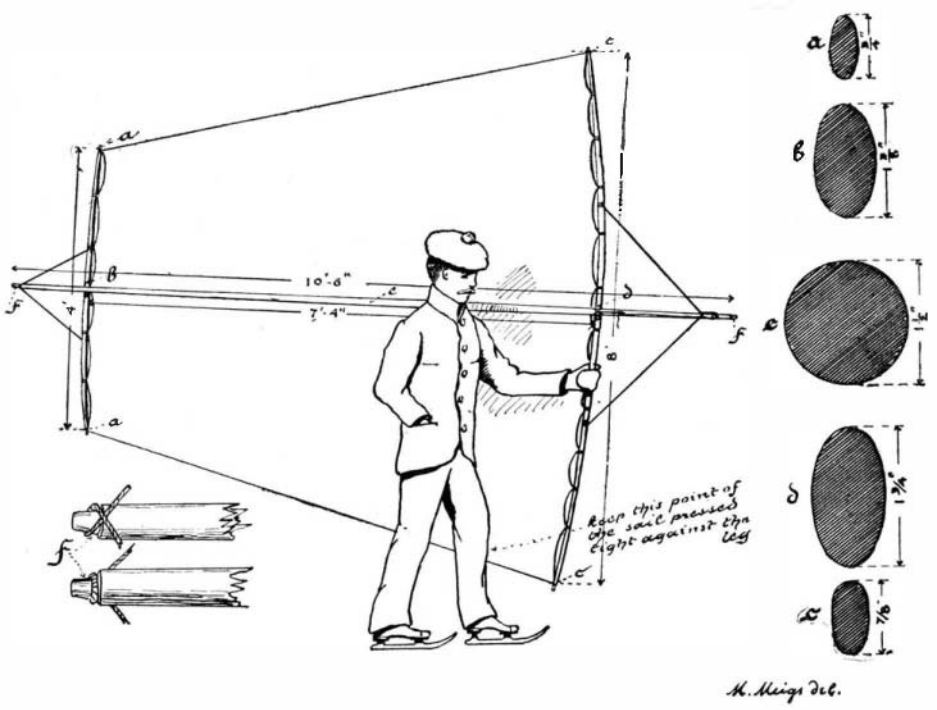
HOW TO SAIL ON SKATES.

The accompanying representation of an easily made sail, designed to add greatly to the pleasure of skating, is sent us by Mr. Montgomery Meigs, of Keokuk, Iowa, who styles it a Swedish sail, as it was introduced by a gentleman from Sweden. The spread of canvas is sufficient to afford considerable sport in even a moderate breeze. In tacking, the free hand is raised above the head and grasps the main spar above the horizontal mast, when the sail is quickly passed over the head to a similar position on the other or right hand side of the skater, the right hand then keeping hold of the spar instead of the left, as shown in the picture, and the mast resting on the right shoulder. Long racing skates are preferable, as they pass more easily over obstructions and give a better foothold on the ice. The cross sections show the full size of the mast and spars at different points. The halyards at the large end unite in a single cord that passes over a pulley let into a slot in the mast, and the end of this cord, when the sail is strained and fastened, is used to lash the mast and spar together.



SKATING WITH THE AID OF A SAIL SWEDISH SYSTEM.

Explosion of Gasoline.

Gasoline is so largely used as a cleaning agent and insecticide that it is remarkable that there are not more serious accidents attending its use. Three persons were injured on February 15 by an explosion of gasoline in a sleeping car in the Pennsylvania Railroad yard at Pittsburg. The cleaners were renovating the upholstery with gasoline, when suddenly there was an explosion which hurled the occupants of the sleeper to one side, rendering them unconscious. The sides of the car were bulged out and the roof lifted off. Every window and door was blown from its fastenings. In fact, the car above the trucks was a wreck. Two adjacent cars were badly injured. The cause of the explosion has not been explained.

THE FULLER ACETYLENE APPARATUS.

While much has been published in the daily and technical press concerning the "new gas," acetylene, it is only those who have seen it who can realize what a wonderful illuminant it is. In it we have a gas producing the whitest light that any gas can develop, a light comparable with that produced by the oxyhydrogen burner, and so bright as to be available for magic lantern and other scientific work. One of the interesting features of acetylene is that it can be generated for use with compact apparatus.

The two illustrations represent the Fuller acetylene generator shown in use for scientific purposes. The generator, constructed largely on the principle of the Dabereiner lamp, is shown in the cuts, standing up on the floor. The outer vessel is a tank containing water and provided with a concentric core to reduce the quantity of water required to fill it. In this tank of water is inverted a gas-holder bell, whose top in the cuts is seen projecting above the tank. In the projecting top is inserted a second small bell of metal, which is made gas tight in its position by a water seal. This bell carries a suitable basket for holding carbide of calcium, and the proportions of the apparatus are such that when the gas holder is immersed in the tank, the latter containing the proper quantity of water, the carbide basket will be under water. If charged with carbide, gas will be rapidly generated, causing an increase of pressure within the bell or holder, with consequent depression of water. This depression causes the water to leave the carbide, and generation of gas ceases. Should this depression be insufficient to provide for the gases generated, the holder itself will rise until something like a cubic foot of gas will be accumulated. On the other hand, if the gas is drawn off, the pressure will fall, water will again rise and come in contact with the carbide, again generating gas.

Referring to the cuts, a small tank or vessel is seen attached to the side of the tank. This is a simple surface condenser cooled by water, the purpose of which condenser is to remove water from the gas in order that it shall be dry. Moreover, the gas, as will be seen, is collected from the very top of the bell. In rising to this point it comes to a certain extent in contact with the upper layers of the carbide, which in their turn act as a very efficient drier. Thus the gas is delivered in the best possible condition to the burners.

THE FULLER ACETYLENE STEREOPTICON BURNERS.

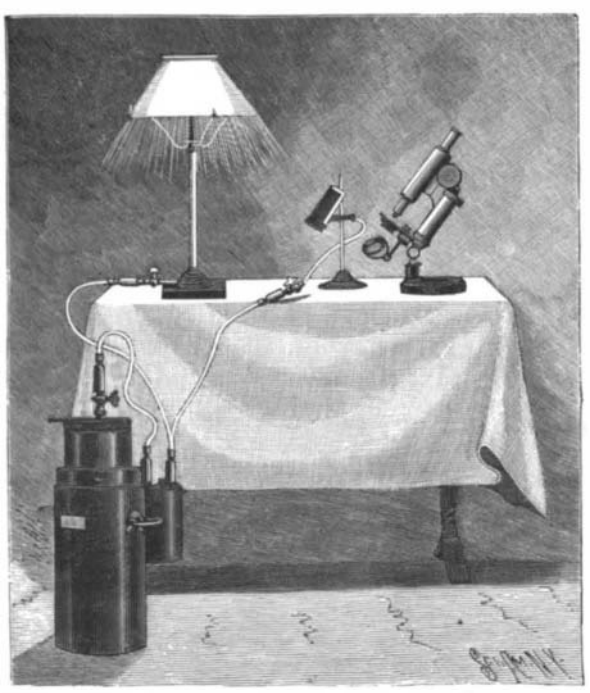
One of the cuts shows the apparatus in use for microscopic and reading purposes, the same generator supplying a special burner for the microscope and a standard reading light. Another cut shows a four flame burner for a magic lantern. In order to give the construction adopted, the burner is shown standing on the table and drawn back from its position in the body of the lantern.

This apparatus is the invention of Mr. H. F. Fuller, M.A., F.F.S.C., a well known scientific authority identified with the construction of apparatus of demonstration for many years. It is being manufactured by the Walmsley, Fuller & Company, 134 Wabash Ave., Chicago, Ill.

In the larger form of apparatus it is proposed to have the surface condenser supplied by a constant stream of water to condense the steam from the gas. In the smaller type of apparatus here shown this is found to be quite unnecessary.

To Clean Windows.

Choose a dull day, or at least a time when the sun is not shining on the window; when the sun shines on the window it causes it to be dry streaked, no matter how much it is rubbed. Take a painter's brush and dust them inside and out, washing all the woodwork inside before touching the glass.



THE FULLER ACETYLENE GENERATOR IN USE FOR READING AND MICROSCOPY.

The latter must be washed simply in warm water diluted with ammonia. Do not use soap. Use a small cloth with a pointed stick to get the dust out of the corners; wipe dry with a soft piece of cotton cloth. Do not use linen, as it makes the glass linty when dry. Polish with tissue paper or old newspapers. This can be done in half the time taken where soap is used, and the result will be brighter windows.—Business.

Marvelous Growth of American Iron and Steel Production.

The directory of the iron and steel works of the United States, which is published every two years, has just been issued. Its contents bear very striking testimony to the expansion of a department of national industry which has reached proportions unequaled in any other country of the world. Twenty years ago, says the Boston Herald, the capacity of the blast furnaces of the United States was 4,856,455 tons; to-day it is 17,373,637 tons. But for the output of 1876, 713 furnaces were required, while for that of 1896, 469 furnaces are adequate. The average annual capacity of the blast furnace of twenty years ago was 6,811 gross tons, while to-day it is 37,044 tons. A still more striking evidence of the revolution that has taken place in the methods of iron production may be found in the fact that the four new furnaces now being constructed for the Carnegie Steel Company will have an aggregate annual capacity of 700,000 tons, or 175,000 tons each. These will be the largest furnaces in the world, and it is significant of the change that has come over the trade since 1894 that, while in that year not one new furnace was building in this country, there are to-day, beside these gigantic four, twenty other new furnaces either in construction or projected. A steadily decreasing number of blast furnaces use charcoal, the proportion being reduced to less than 6 per cent of the whole; for the rest coal and coke serve as fuel. The directory enumerates and describes 505 rolling mills and steel works, the annual converting capacity of all the standard Bessemer steel plants in January last, built and building, being 9,472,350 tons of ingots and direct castings, against 7,740,000 tons in January, 1894. Of the open hearth steel plants at work or in construction, the annual capacity is 2,430,450 tons, against 1,740,000 tons two years ago. It thus appears that, while the increase in the capacity of the Bessemer steel plants has been 18 per cent in two years, that of the open hearth steel plants has been 28 per cent. Evidence of the production-restricting policy of the nail trust will be found in the fact that while in January, 1892, there were sixty-five rolling mills devoted in whole or in part to the manufacture of cut nails and spikes, and containing 5,546 nail machines, the number had decreased by January, 1894, to fifty-five mills and 5,094 machines, and in January, 1896, to fifty-three mills and 4,598 machines. A decrease of 948 nail machines in two years side by side with a great increase of capacity in every other branch of the iron and steel industry is a fact replete with significance, and to be only partially offset by the increased output of the wire nail works.

It further appears from the directory that there are seventy-four iron and steel bridge building works in the United States, twenty-two locomotive works, thirty-six iron and steel shipbuilding yards, sixty-four completed car axle works and two building, 112 completed car wheel works and one partly erected, and 112 car building works. In addition to these, there are thirteen horse nail works, eighty-two malleable iron works, seventy cast iron and cast steel pipe works, and thirty-eight wrought iron and wrought steel pipe, iron and steel riveted pipe and seamless tube works. These are but part of the many establishments in which the cruder iron and steel materials are taken up and developed into more or less finished products, but even their bare enumeration gives an impressive idea of the magnitude of this branch of American manufactures.

SECRETARY HERBERT has requested from Congress an appropriation of $50,000 to enable the Navy Department to test methods of throwing high explosives from guns on board ship with ordinary velocities.