

IMPROVED ICE-MAKING MACHINE.

The following is an explanation of the mode of working this machine, which will be readily understood on referring to the illustration: The refrigerator, A, a copper tubular vessel, is charged with the requisite supply of liquid ether, which, by the action of the vacuum pump, B, is evaporated, drawn away in the form of vapor, and passed into the copper tubular condenser, C, where, under a slight pressure and by the aid of a stream of water, it is again reduced to its liquid state, and then returned through the ether meter, D, to the refrigerator, A, to be re-evaporated. Thus the same ether is used continuously, with inappreciable loss. The ether meter, D, regulates the flow of the liquid ether to the refrigerator, rendering the machine self-acting. The hand pump, F, and condenser, G, in connection with it, are valuable in economizing ether to the utmost degree, as without them much would be blown into the air and wasted. No machine is complete without these adjuncts. To utilize the cold produced by the evaporation of the ether for the purpose of making ice, an ungelable liquid, such as very strong brine, is forced by the pump, E, through the tubes of the refrigerator, A, parting with its heat to the ether vapor on its passage, and leaving that vessel at a temperature many degrees below freezing point, to be used in the freezing tanks as described below. For the manufacture of pure transparent ice in large blocks the machine is provided with a large tank—or several tanks, according to the size of machine—which is filled with the pure water to be frozen. In this tank a number of hollow metal cells or slabs are fitted, and connected to each other and to the refrigerator of the machine, A. Through these cells the cold brine, after leaving the refrigerator at a temperature of from 14° to 20° Fah., is continually circulated, causing the pure water in the tank to congeal on each of their surfaces until a sufficient thickness of ice has been obtained, when the blocks are readily removed by a very simple arrangement. To make perfectly clear ice, it is imperative that the fixed air contained in the water be allowed to escape freely during the freezing process, and to attain this end the tank is fitted with moving arms or agitators, which are caused to move slowly up and down or to and fro between the cells in the pure water, keeping it constantly agitated, and so facilitating the expulsion of the air. By this process perfectly transparent ice is produced in any quantity and in any climate, in blocks about 4 feet x 3 feet, and 4 inches to 12 inches thick. It is found that, after attaining a thickness of 4 inches, the ice does not form so quickly, and therefore the production of the machines is somewhat less when the thickness of the blocks is increased; but this is overcome and the efficiency of the machine maintained by a simple arrangement, by which two blocks are frozen together after a thickness of 4 inches to 6 inches has been attained, and a block of transparent ice 8 or 12 inches thick is produced in half the time required by any other process.

TWO-STORY RAILWAY CARS.

Since April 1, 1873, there has been in force a new federal law, concerning the building and working of all railways on Swiss territory. The extent of working railways in the Confederation at present amounts to about 1,000 English miles, while about one half this length is at the present time either building or concessioned. There are no State railways in Switzerland, the lines having been promoted mainly by private enterprise, and aided, in many cases, by governmental, or rather cantonal, subventions. Most of the new lines will open up shorter routes towards the International Gothard line now in course of construction, and these are therefore being made, like the rest of the Swiss lines, of the standard gage, namely, 4 feet 8½ inches. The Swiss are now also building meter (39.3 inches) gage lines, a width which has been found amply sufficient in many parts of this country for local traffic.

With the marked predilection that has sprung up in Switzerland, both among the companies and the public, in favor of two-storied cars for branch line service, the federal inspectors for railways have set themselves to the task of studying this question, and the design of a four-wheeled standard gage car, of which we annex engravings, is the result of these studies. Twelve cars on this plan are now building at the Swiss railway carriage and wagon works of Neuhausen, Fribourg, and Bern.

As will be seen, the cars are constructed on the so-called semi-American type, with platforms at each end, and with a central passage all along the train, such as has been stipu-

lained, but in addition the vessel is more easily steered, and there is little or no vibration felt, while it is next to impossible to foul the screw. Another and, in one sense, most important fact was also discovered while the Bruiser was at sea, namely, that when pitching in heavy seas the engine worked as smoothly as in fine weather, the cause being attributable to the fact that when the stern is lifted the casing holds a quantity of water which offers sufficient resistance to the motion of the propeller to prevent the engines racing.

International Patent Laws.

Mr. Lloyd Wise argues in favor of the following, among other points, as a basis for an international patent law:

"Every application for letters patent should undergo examination, limited to the questions whether the specifications are clear and whether the invention is open to objection as being contrary to morality, or wanting in novelty, regard being had to prior publications in the patent office.

Should the result of the examination as to novelty be unfavorable, the applicant should be nevertheless entitled to obtain his patent, subject to the insertion in his specification of an acknowledgment of the existence of the prior matter found and pointed out by the patent office officials, with a clear statement of what he nevertheless claims.

Patents should be refused only in cases of fraud or where the invention is contrary to morality. Other points should be left to be adjudicated upon by the courts only, in case the validity of the patent should come into question.

There should be no publication of any report or opinion of the examining authorities as respects any application for a patent, saving reports of pro-

ceedings in disputed cases.

Thus on the one hand applicants who had been anticipated would be saved the useless expenditure they might incur if left in ignorance of the fact; and on the other hand, they could not become sufferers by reason of any erroneous judgment of the examining authorities. Moreover, the public would be amply protected by having all the facts (and facts only) placed in juxtaposition before them in the specification.

Where the examining authorities have the power of refusing an application for a patent on the ground of want of novelty, there must always be considerable risk of injustice to the inventor, there being in many instances scope for diversity of opinion. Nor is the difficulty obviated by providing means of appeal. Appeals are somewhat costly; consequently, in a pecuniary sense, might may in the long run prevail over right.

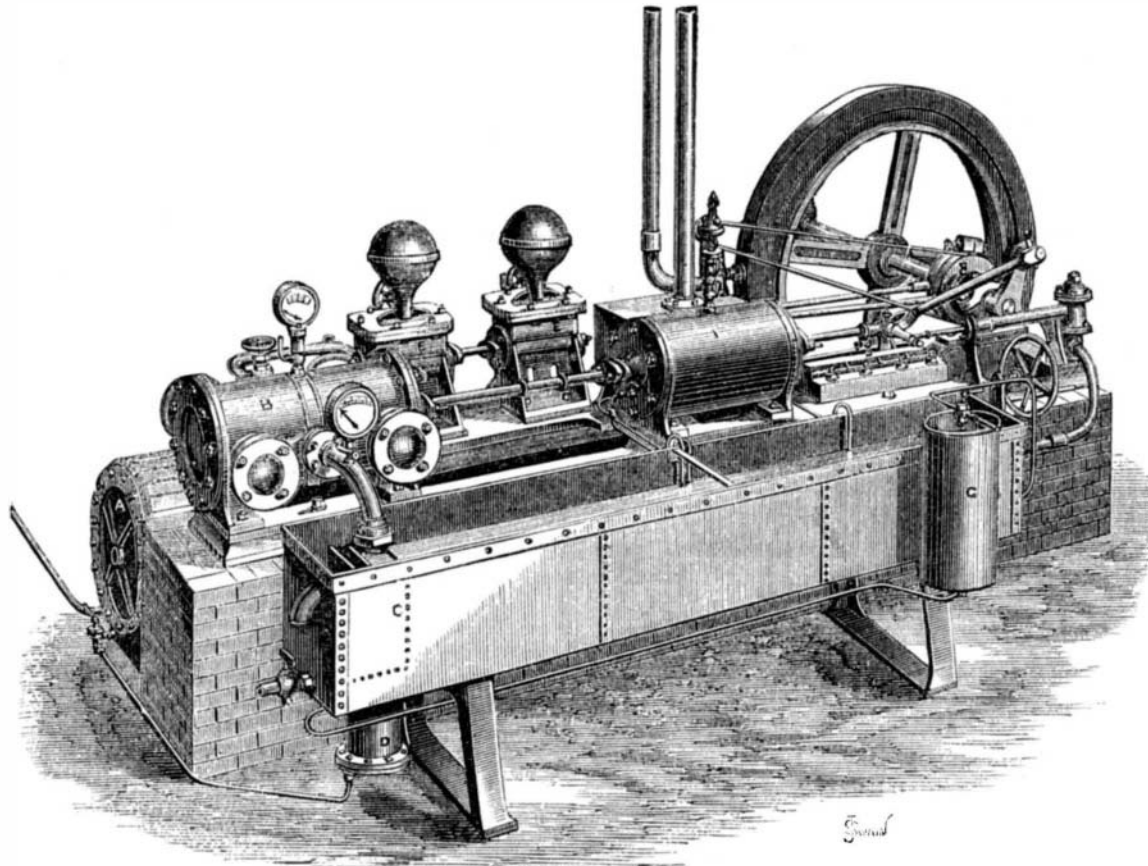
Moreover, where the power of refusal obtains, as in the United States, there results a widespread idea that a patent once granted is practically indefeasible. Of course, people well acquainted with the law know better, but I am for the moment speaking of members of the outside public who may nevertheless have interests at stake.

Now I think the plan above proposed, while securing justice alike to the inventor and the public, would not be liable to such misinterpretation.

Provisional protection should be granted for twelve months at a nominal cost, to allow time, not only for perfecting the invention, so that it may be properly and fully described in the complete specification, but also for obtaining, if needful, the cooperation of capitalists."

The Oil Diagoneter.

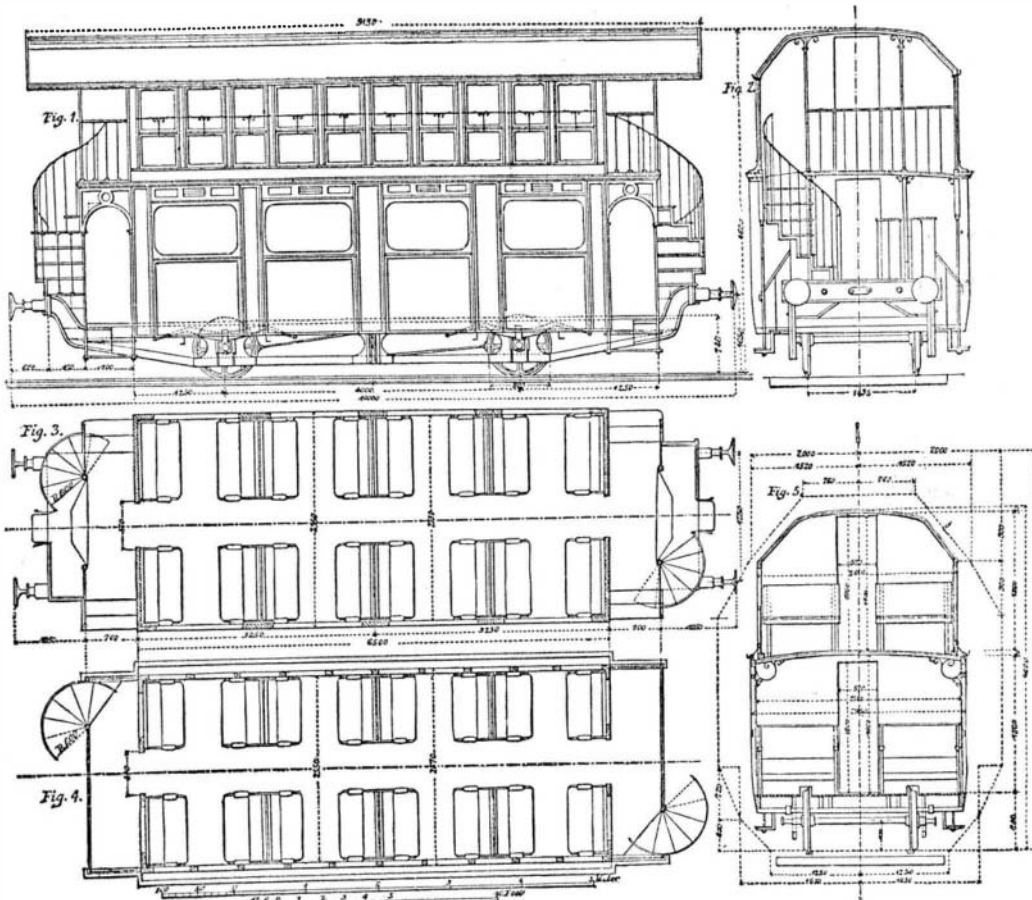
Professor Palmieri has discovered a new instrument which he calls a diagoneter, and which is constructed for the rapid examination of oils and textures by means of electricity. What the apparatus will do, Professor Palmieri details thus: 1. It will show the quality of olive oil. 2. It will distinguish olive oil from seed oil. 3. It will indicate whether olive oil, although of the best appearance, has been mixed with seed oil. 4. It will show the quality of seed oils. 5. Finally, it will indicate the presence of cotton in silken or woollen textures.



SIDDELEY AND MACKAY'S ICE-MAKING MACHINE.

lated by the new regulations. The staircases admit of very ready access to the upper story without interfering in the least either with the central passage or with the end platforms. Each story contains 32 first and second class seats, arranged on double-seated benches, while two more seats are provided for on the upper balconies, making thus 66 seats in all.

The other peculiarities of these fine cars will be gleaned from our engraving, and therefore we need say little about them. They are well suited for use in summer weather.



TWO-STORY RAILROAD CARS FOR SWISS BRANCH LINES.

The carriages are very solidly constructed, and weigh empty 10 tons, equivalent to 3 cwt. per passenger, while they cost \$2,250 a piece, making \$34 per seat.

Griffiths' Propeller.

The trials of the British iron steamer Bruiser, with a casing over the propeller, on Mr. Griffiths' plan, have yielded very satisfactory results. Not only is an increased speed ob-