New Inventions.

Improved Wind-Wheel.

It is very curious to observe the impression which the same object will produce upon different minds; thus, for example, to a poetic mind the wind is a gentle zephyr or a hurrying blast, and always calls up a quotation from Falconer's "Shipwreck," or some other well-known poem; to the artistic the very feel of the wind, as it blows aside the garment or lazily fans the cheek, causes visions of sweet landscapes in which scattered leaves and waving grain are prominent and characteristic; while to the practical man it is a force of so many pounds to the square foot of surface which can be made available to drive machinery and save labor. The result of one of these latter's genius forms the subject of our illustration, which is a perspective view of the wind-wheel invented by A. L. Butterfield, of West Dummerston, Vt., and patented by him January 18, 1859.

A represents a vertical shaft which is fitted or placed in a proper framing. B and C represent four horizontal arms which are attached to the shaft, A, at its upper end, and to the end of each arm, C, a rectangular frame, D, is attached.

To the frames, D, the sails, E, are attached, one to each. These sails are formed each of two V-shaped boards or plates, *a a*, the edge of which at each side are connected by leather *b*, or any other suitable flexible substance or fabric. The back or narrow end of the upper plate of each sail is hinged to the corresponding end of the lower plate or board, and the leather or fabric, *b*, is allowed to be sufficiently full to enable the plates, *a a*, to be distended so that each sail will form a chamber to receive the wind. To the back part of each bottom plate, *a*, of the sails, an ordinary flap valve is attached.

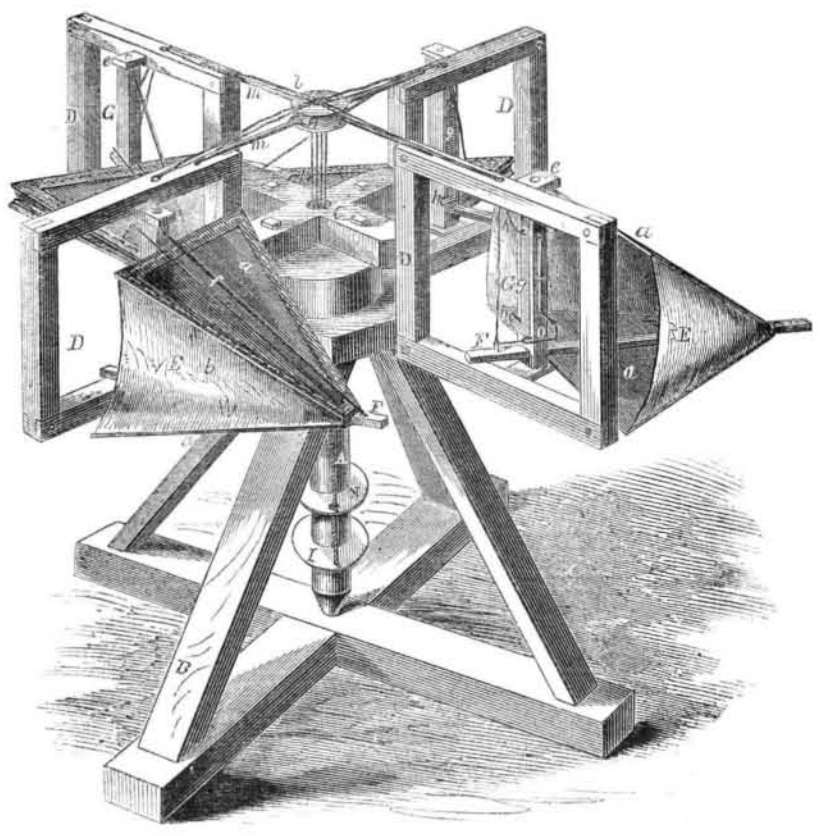
To the bottom plate, *a*, of each sail, a bar, F, is secured. The bars, F, pass entirely through the sails, and the front ends of the bars are secured to the lower ends of uprights, G, fitted in latter projections, *e*, attached to the frame, D, the journals of the uprights being allowed to turn freely in the projections, *e*. The sails, E, therefore, it will be seen, have a certain degree of lateral play allowed them, the object of which will be hereinafter shown. A rod, *f*, is attached to the back ends of each bar, E, and to the upper parts of the uprights, G.

In each upright, G, a slide, *g* is placed, which moves freely up and down in the uprights, and each slide has a small arm, *h*, projecting horizontally from it. To the upper plates, *a*, rods, *i*, are attached, one to each, said rods projecting from the fronts of the plates and passing through guides attached to the sides of the uprights, and resting on the arms, *h*. To the upper end of each slide, *g*, a cord or chain, *k*, is attached, and these cords pass upward through the upper parts of the frames, D, and are connected to cords or chains, *l*, which pass through a guide plate, A, which is secured to the ends of rods, *m*, that project from the upper end of the frames, D; the plate, H, being directly over the top of the shaft, A. The cords, *l*, pass down into the upper part of the shaft, A, and through holes in its side, and are attached to a ring or annular plate, *n*, which encompasses the shaft, A.

To each upright, C, a spring-catch, O, is attached. These catches are so arranged as to project over the front edges of the upper plate, *a*, when they are down or rest on the lower plates and the upper plates in such position. To each catch, *o*, a cord, *p*, is attached. The cords pass like *l*, to a ring, I.

The operation is as follows:—When the wind-wheel is at rest, the sails, E, are closed, that is to say, the upper and lower plates, *a a*, are quite close together, and the catches, *o*, project over the upper plates, *a*, and prevent the wind from raising them. When the wheel is to be operated, the attendant draws the chains or cords, *q q*, so as to reduce the catches, *o*. The cords or chains, *l*, are then also drawn down and secured down at a certain point, so as to raise the upper plates, *a*, above the lower parts of the catches, *o*, and thereby prevent the latter from passing over them. The wind will then rotate the wheel, each sail, as its mouth faces the wind, receiving the wind which distends it, the sails collapsing as their back ends face the wind. The sails, E, in consequence of being attached to the arms, *c*, as shown and described, are, by means of the lateral play or movement allowed them in the frames, D, enabled

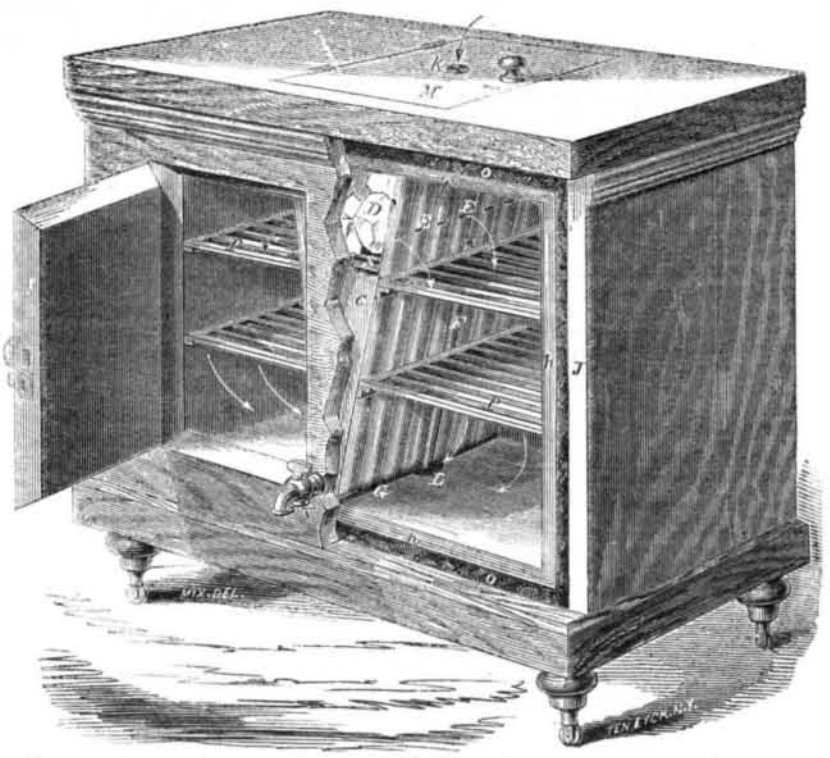
BUTTERFIELD'S WIND-WHEEL.



to adjust themselves properly to the wind, so that the latter will act against them at right angles. The upper plates, *a*, when the wheel is not to be rotated are allowed to descend, the cords, *l*, being lowered, and the stops, *o*, will again pass over the upper plates, *a*, and prevent them from rising. In case the wind has great velocity, the wheel is prevented from having two great a speed in consequence of the valves, *c*, opening, the springs yielding to the pressure and allowing a portion of the wind that enters the sail to escape.

This wheel is very convenient for the tops of buildings, and with it the farmer can always have a power that costs nothing, and ready to do his work. Those of our readers who wish for any further particulars can obtain them from the inventor by addressing him at Greenfield, Mass.

BARTLETT'S IMPROVED REFRIGERATOR.



Although the weather is not yet quite warm enough to require the plentiful use of ice, it will not be long before the burning rays of the summer sun will scorch us, and make all our food unpleasantly warm. It therefore behoves the careful housekeeper to see that the refrigerator is in proper order, or to buy a new one as soon as possible. We therefore present to our readers an engraving of one of the more recent that have been invented, which not only has the advantage of being novel, but also of fulfilling perfectly the purpose for which it is intended.

J is the outer casing of the refrigerator, and *h h* the inner, the space, *o o*, being filled with charcoal. The ice receptacle, C, is wedge-shaped, and the ice, D, is placed upon slats, S, in the upper part of it. The door, M, at the top of the ice receptacle, can be locked, so that in situations where ice is very expensive, it will be safe from thieves. F is the ice-water reservoir provided with a faucet V, to draw the water off as wanted, and any moisture from the chambers runs off through the groove, G, L, without coming in contact with the food. The receptacle, C, divides the refrigerator into two chambers, in each of which articles can be kept perfectly separate from each other, and a current of air entering the ice-chamber through the orifice *k*, in the door, M, and passing into the meat chambers through the orifices, E, and so gently down to the lower portion, L, thus keeping up perfect ventilation in the device. P are shelves for the support of articles, and T is a zinc lining for the inner casing. This is a very economic arrangement, using but little ice to produce continued cold; there is no drip, and all the frigerific properties of the ice-water as well as the ice are retained. G is a groove by which any moisture is carried away.

The inventor is A. H. Bartlett, of Spuyten-Duyvel, N. Y., and the invention was patented Nov. 23, 1858. Any further information may be obtained from the manufacturers, Bartlett & Lesley, 380 Broadway, New York.

Science of Steel Making.

There is certainly a very great difference between the qualities of cast iron and beautiful cast steel, and yet the difference between their compositions is but trifling. Cast iron and steel are compounds of iron and carbon; hard wrought iron contains of carbon 0·4 per cent; soft steel 0·5 per cent. Hard steel 2·4 per cent; common cast iron 2·5 per cent; and hard cast iron 5·0 per cent. From the composition of cast iron and steel, it is evident, that, if the former can be deprived of its surplus carbon, it will become steel. In England, the processes in use for doing this are first to decarbonize the cast iron, and reduce it to the condition of wrought iron, after which, it is again carbonized to that degree which renders it steel. This is certainly a very circuitous way of arriving at the result, nevertheless, it is the common mode. In Germany, on the other hand, steel is now made by taking away the surplus carbon from the cast iron, by a puddling process, and this appears to be by far the most scientific method.

It may be said, that there are several impurities in cast iron, such as silica and sulphur, which require to be removed, hence it is necessary to do this by the English method, in order to produce good steel. This is mere assertion without proof; for since steel has recently been made in Germany by the short process, there is no reason why the longer one should be followed anywhere. This is a subject of great importance to our iron manufacturers, because, cheap cast steel is a great desideratum. It is nearly three times stronger than wrought iron, and being of a uniform texture, it wears more uniformly, hence it is the best material for machinery, and could it only be produced as cheap, it would be universally used in preference.

A New Propeller.

A new method of propelling boats has been invented by J. Buchanan, Greenock, and is illustrated in the Glasgow *Practical Mechanics' Journal*. It consists in the application of oars which are operated by a peculiar mechanism, to give them the same action as a sculling blade. These propellers project below the keel of the vessel and are very compact, but at the same time apparently inferior to the rotary screw. The tail of a fish is the most simple propeller in the world, and a sculling oar, if its blade were made of thin steel, so as to assume the screw form in moving, would be the exact counterpart. It is intended that this sculling propeller of Mr. Buchanan shall be applied in deep sea fisheries, and be worked by hand, for which purposes it is in a certain degree applicable, and may also be used by American mackerel fishermen.