New Inventions.

Conversion of Pig Iron into Steel and Malleable Iron.

It has oftentimes been a subject of remark that wrought iron tubes employed in the production of *sodium* are never converted into cast iron, although the carbonate of soda from which sodium is distilled contains a large amount of carbon. M. Tissier, of Paris, has recently made some experiments in connection with this subject, and has ascertained that wrought iron is not affected in any way by the carbonate alluded to, even at a very high temperature. He tried the action of the carbonate of soda upon malleable and cast iron at the melting point of the latter, and found that while the malleable iron was not affected, the cast iron was deprived of its carbon and silicon, and converted into malleable iron. M. Tissier also operated on gray pig iron containing six and a half per cent of silicon, and graphitic carbon. The iron was heated with an excess of carbonate of soda at a bright red heat for several hours. It boiled up, evolving bubbles of carbonic oxyd, and when this action ended, the iron was withdrawn and immersed in water. The result was, that this iron, formerly so brittle, could now be forged under the hammer and welded; its granular structure had disappeared—it had become fibrous crystalline. The action of the carbonate, as reported in the *Le Technologiste Juillet* removed all the sulphur and phosphorus from the iron, as well as the silicon. M. Tissier has only made experiments with small masses of iron; and although the results of his efforts are interesting as a matter of science, yet practically they are of little value, because the metal so treated, although changed from pig to malleable and wrought iron becomes too porous—it was full of cavities. Something practically useful, however, may yet be derived from the discovery. It is for this reason we direct attention to it.

Improved Window Blind.

In climates where, during the almost tropical heat of summer, every breath of air is regarded as a blessing, and every stray breeze must be caught to cool us in our parlors and rooms, the ordinary close shutter is worse than useless, as it excludes all air and hinders ventilation. The blind that we ordinarily adopt, which can be closed to keep out the noonday sun and yet give vent to air, is one of the most striking instances of perfect adaptability with which we are conversant. As they are everywhere used, it may not be uninteresting to say a word or two concerning their history and journeyings. Venice claims the invention of them, and to this day, everywhere, they are called Venetian shutters; from that city of refinement they were spread over the whole continent of Europe, and were brought to our Southern continent by the Spaniards, and to our Northern latitude by the Dutch, the climate of England rendering their use unnecessary, and although applicable anywhere, in that country they are seldom seen. They are almost universal now in every city of the Southern hemisphere, and form a distinct feature of likeness between all cities where warm summers are felt.

In the good old times, when robbery and housebreaking were not quite so common, these blinds made of wood were an all-sufficient protection; but now, the housebreaker's art having advanced with everything else, the method of fastening them has been found unsafe, and the improvement we are about to describe consists in making the fastening more secure, so that they are less liable to be broken open, and in constructing them of iron, thus rendering them fireproof.

In our engraving, Fig. 1 represents a window, with the blinds attached, one being open to show the fastening arrangement, and Fig. 2 a view of the slats, illustrating their method of attachment to the frame. A is the frame, having the hollow tubes, B, running up each side, better seen at Fig. 2 in a slot in which *b*, the slat, C, is held by a wire, D, running the whole length of the tube. By withdrawing this wire all the slats are released, thus affording great facilities for repairing. The method of fastening them close or keeping them open is seen in the two figures. The slat has a piece, *c*, worked on it or left in cutting it out, which fits in a slot in a central tube, E, connecting all the slats, and through a hole in *c*, the wire, *e*, passes, attaching the slats to E in the same manner that they are attached to B. This tube, E, is also provided with a sliding wire, F, and two small slots, *f* and *g*, which receive the bent wire, G, that is attached to the side of the frame, and can move in it so that when the slats are to be open it will fit into the lower slot, *g*, as seen

COCHRAN'S WINDOW BLIND.

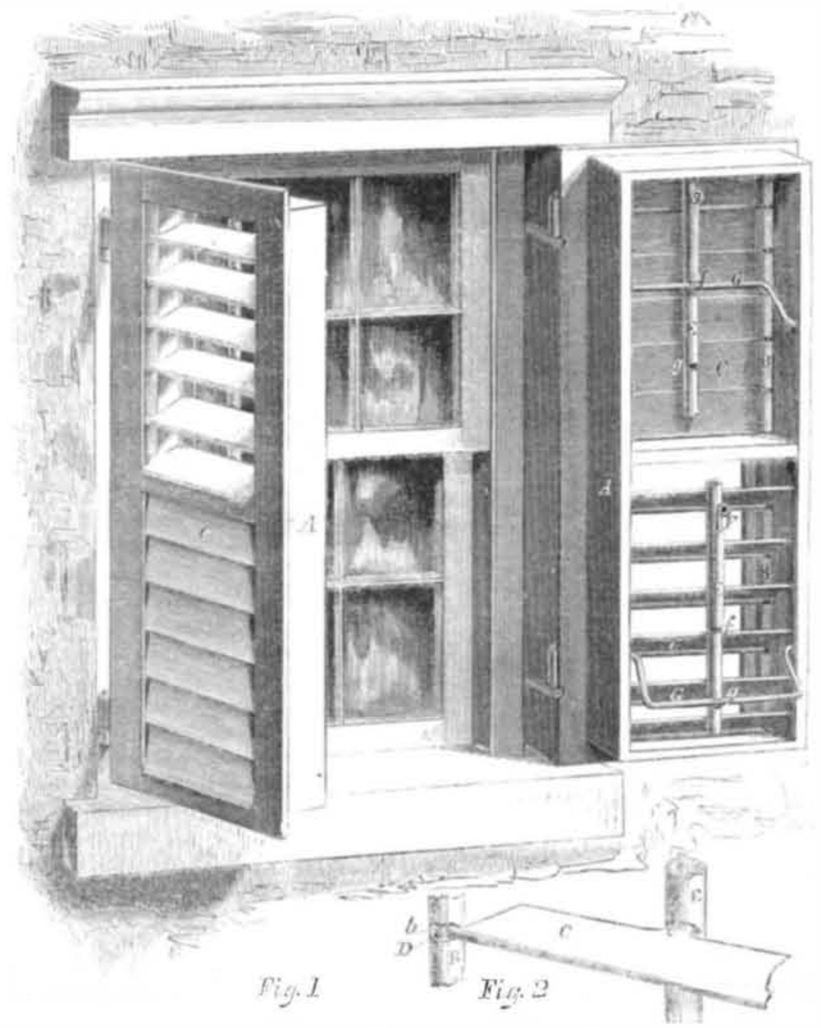
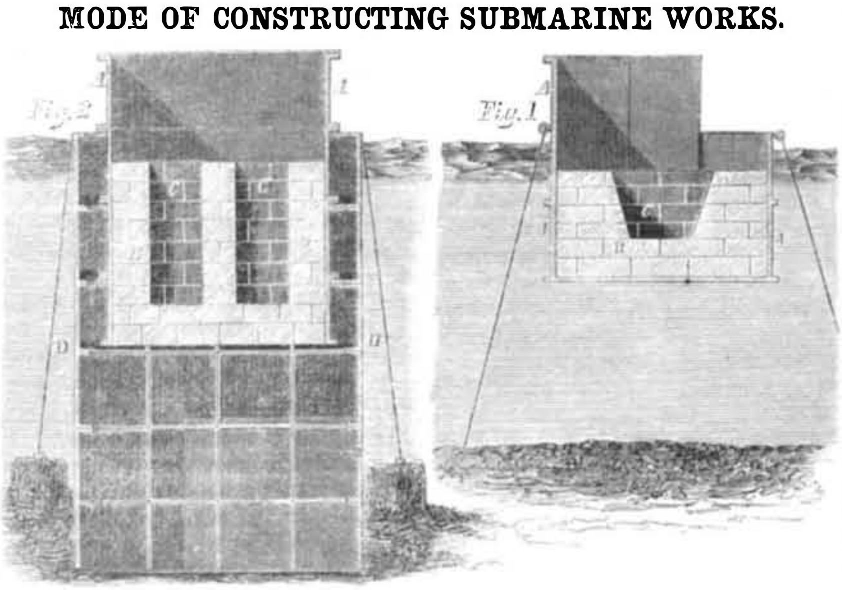


Fig. 1 Fig. 2

in the lower half of the blind, and when they are to be kept shut, it will fit into *f*, as seen the upper half, the sliding wire will be pushed over it, and it is most securely fixed. The principle of fastening and attaching the slats can be equally as well applied to wood as iron, the advantage of iron being that it is fire and burglar proof.

It is the invention of A. M. Cochran, of 280 West Thirty-fifth street, New York, and was patented by him through the Scientific American Patent Agency, on the 3d of February, 1857. A bronze medal was awarded to the inventor at the last annual Fair of the American Institute held in the New York Crystal Palace, where it was exhibited. He will give any further information that may be desired.

MODE OF CONSTRUCTING SUBMARINE WORKS.



This invention (which we transcribe from the London *Engineer*) relates to a mode of simplifying the construction of foundations of piers, harbors and other submarine structures. To attain this end, a floating caisson is formed of plates of cast or wrought iron, bolted or riveted together, and this floating vessel (which is open at the upper part) is brought over the spot which is intended to receive a large block of concrete or masonry. The floating vessel being moored in the required place, concrete is discharged into it, or brick or stone-work is built up in it, as required, and by the accumulation of such building materials in the vessel the latter is sunk to a given depth in the water. The sides of the vessel are built up by adding plates of iron to the upper part of the vessel, and thus its capacity and depth is increased—the upper edge of the vessel being raised considerably above the surface of the water.

Fig. 1 shows a section of one of the caissons in the course of construction. A A is the outer casing, made of sheets or plates of iron, bolted together by flanges or otherwise, so as to form a vessel open at top. B is the masonry or brick-work which is being built up inside, a vacant space C being left in the middle, to give buoyancy to the vessel while its construction is proceeding. When the weight of the masonry inside has sunk the edge of the vessel to within a yard or so of the surface of the water, an additional row of iron plates are secured on its top edge, so as to increase its hight and capacity, and when this has been completed, the masonry work is proceeded with as before. The building up of the vessel in this manner will be carried on until the bottom reaches the ground, and becomes firmly imbedded in it, when the vacant space C, will be filled in with concrete or rubble masonry. A modification of the above arrangement may be made by constructing the outer casing of sheet or plate iron, as before, but filling the interior with concrete, a vacant space being, however, left in the center of the vessel by placing a second cylindrical or other conveniently-shaped vessel within the first, so as to render the vessel buoyant until it reaches its seat at bottom. In constructing piers, harbors, walls, or any structure projecting out from the land into the sea, it will be evident that instead of mooring the caissons or vessels while they are being constructed and filled with masonry, they may be supported by cranes, or secured to crabs fixed upon the finished part of the structure.

The patentee describes in his specification several different plans for constructing the caissons or vessels inside a protecting shield, kerb, or outer vessel. Fig. 2 shows a vertical section of the simplest form of a protecting shield or casing. A A represents the inner vessel, B B the masonry or brickwork within it, and C C the vacant spaces, which are subsequently filled up with rubble, masonry, or concrete, as before explained. D D is the outer casing, constructed in the same manner as the inner one, but open at bottom, so that its lower edges may rest upon the ground and sink into it, if the ground is soft. By mooring this casing and sinking it on the desired spot, divers may be allowed to descend to the bottom and prepare the ground for the reception of the caisson or vessel which is to be constructed and sunk in it, after which the outer vessel may be raised and used for the next caisson.

Peculiarities of Bottle Glass.

Bottle glass is the cheapest kind, and made of ordinary materials; these are generally sand, with lime, and sometimes clay, and alkaline ashes of any kind. The green color is owing to impurities in the ashes, generally to oxyd of iron. This glass is hard, strong, and less subject to corrosion by acids than flint glass. For bottles containing the effervescing wines, great care is necessary in the making; the materials must be thoroughly mixed, when the mass is in a state of fusion, and the thickness should be uniform throughout, in order to resist the pressure of the contained carbonic acid. The loss of bottles by bursting, in the champagne trade, is from twenty to thirty per cent; a machine has been contrived to test their strength, which ought to be equal to bear the pressure of from twenty-five to thirty-five atmospheres. In bottles to contain acids, the alkali and the lime should be chemically united, to prevent action of the acid.

The Horse-Shoe Crab.

This animal, otherwise called the *Limulus*, or king crab, so common to our eastern coast, is not at all known in Europe except from the specimens and descriptions that have been sent over, and is one of the first animals that shows the naturalist from the Eastern that he is in the Western hemisphere.