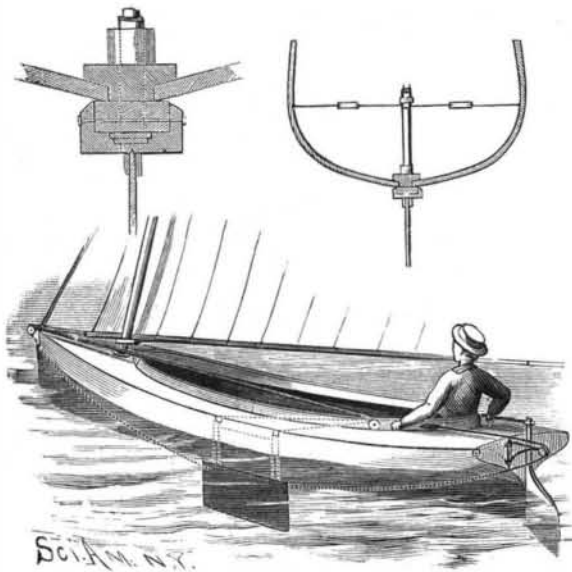


CENTERBOARD FOR VESSELS.

The centerboard here illustrated is so arranged that it may be almost instantly set and removed as the sailing conditions and emergencies may require, the operations being performed by the helmsman at the stern of the vessel. Where the centerboard is inserted the keel is made in two parts, as shown in the enlarged sectional view, between which the side planks of the hull are held. To the lower part is fixed a metal shoe having a longitudinal ranging slot, in which fits the upper edge of the centerboard. Hollow metal plugs having fixed collars at their lower ends are passed upward through the keel, and are screwthreaded at their upper ends to receive screw collars, which, when screwed



McFALL'S CENTERBOARD FOR VESSELS.

home, draw the shoulders tightly to the bottom of the keel and clamp the two parts together, the joints being all water tight. The screw collars project above the plugs to receive the ends of tubes, which are only long enough to substantially support rods whose lower ends are screwed into thimbles fixed to the upper edge of the centerboard. These thimbles have shoulders that fit tightly to the lower ends of the plugs when the centerboard is in place. To the tops of the rods are attached ropes or chains, which are guided over blocks to within easy reach of the helmsman. The tubes are firmly braced by stay rods fixed to their tops and to the sides of the vessel.

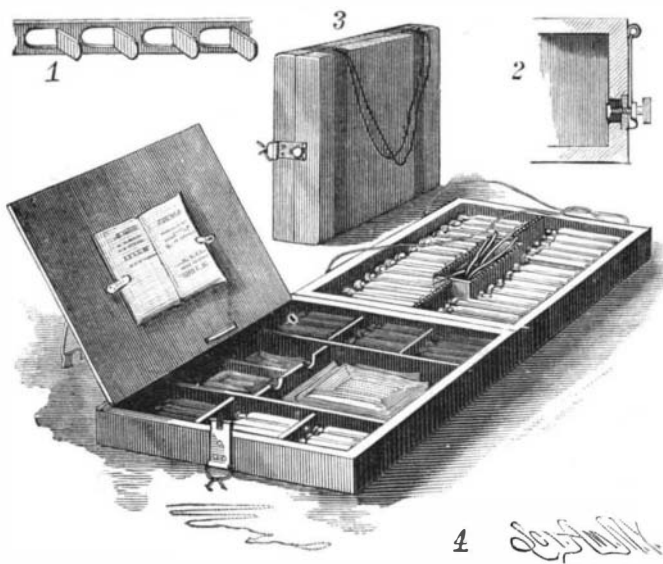
Should the helmsman wish the vessel to drift or make leeway, he will unfasten the chains and let the centerboard fall away some little distance from the keel, and thus become inoperative. By drawing upon the chains, the centerboard may be again brought into use.

Should the centerboard be run hard aground, the rods will be unscrewed from the thimbles, when the boat will be free. If the centerboard is lost, a new one can be easily set by pulling chains attached to the rods of the new one through the tubes, by means of lines. If at any time the centerboard is not needed, the chains are slacked off, and it is pulled on board by chains arranged to pass over either the stem or stern.

This invention has been patented by Mr. David McFall, 213 East 35th Street, New York city.

A MEDICINE CHEST WITH MANY CONVENIENCES.

The illustrations herewith represent a peculiarly partitioned and constructed medicine chest, of a



HUTTON'S MEDICINE CHEST.

flat shape, which has recently been patented by Mr. Terry J. Hutton, of Fergus Falls, Minn. Fig. 1 is a perspective view of a piece of a struck-up metal strip for holding the lower ends of the vials in position, and Fig. 2 is a vertical section of the front end part of the chest when closed, illustrating the fastening, Figs. 3 and 4 showing the chest closed and open respectively.

The chest forms a case composed of upper and lower main sections hinged together at one end, the lower section being principally divided into two longitudinal vial-holding compartments, one above the other, with a central compartment which can be used to hold a drop measure, surgical needle, brushes, etc. The vial-holding sections are arranged to hold vials of different sizes, the vials being securely held in pockets, but so that the labels indicating their contents can be easily read. The upper section of the chest is divided by transverse partitions and a longitudinal partition, to give compartments for holding plasters, bandage strips, etc.; but the partitions are shallow, to allow room for a handbook of directions attached to a cover which fits over this compartment. The lock used is a simple one for the purpose, so the chest may be easily closed or opened, and always carries its own key. When the chest is fully thrown open, and the lid set inclining in its open position, all the contents are exposed to view, and there is no necessity to remove some of them to get at the others. The inventor has likewise obtained a copyright on an appropriate trademark for this chest.

Erosion of Gun Barrels by Powder Products.

At a recent meeting of the Iron and Steel Institute, a paper on this subject was read by Sir Frederick Abel, and Colonel Maitland, superintendent of the Royal Gun Factories, Woolwich. The peculiar action of powder products upon the inner surface or bore of a gun, as they rush from the seat of the charge toward the muzzle, whereby more or less irregular scoring or erosion is produced, is ascribable to the co-operation of three causes, viz., a softening if not a fusing effect, exerted upon the surfaces of the metal by the high heat of the explosion; an increase of this softening or fusing effect by the chemical action of the sulphur upon the metal at the high temperature to which the surface of the latter is very rapidly raised; and the mechanical action of the rush of gases, vapors, and liquid products upon the softened or fused surfaces. The great increase which has been taking place during the last twenty years in the power of artillery has brought the subject of the erosion of gun barrels into prominence, and it is not too much to say that it now forms one of the chief difficulties to be encountered by the maker of a heavy gun. As far as can be seen at present, its sufficient mitigation is the one great difficulty which seems likely to impose a limit on the size and power of ordnance in the future. Erosion is of two kinds, technically known as muzzle loading scoring and breech loading scoring, though both kinds occur to some extent in all guns, whether muzzle loading or breech loading. Muzzle loading scoring is produced by the rush of the powder products over the top of the projectile through the clearance, or windage, which has to be allowed for facility of ramming home the shot along the bore in a muzzle loader. Breech loading scoring is produced by the rush of the powder products behind a shot, acting as a gas-tight plug, during and immediately after its passage through the gun.

Muzzle loading scoring takes place almost entirely in the upper surface of the bore, and its effect diminishes greatly as the velocity of the advancing projectile increases. Breech loading scoring, on the other hand, erodes the bore almost equally all round, and extends toward the muzzle, till the pressure of the expanded gas is so much reduced as to render it ineffective.

It is evident that, *cæt. par.*, erosion will increase with the amount of the powder products, with pressure in the bore, and with the duration of the time of action. Its inconvenience first began to be seriously felt in the 7 inch muzzle loading gun of 7 tons weight, which fired a charge of 30 pounds of powder with a shell of 115 pounds. The great strides which have since been made in the weight of projectile and the amount of powder charge fired from heavy guns have resulted in increased rapidity of the deterioration of guns from this cause; and now that it is proposed to arm the Benbow with 16 1/4 inch breech loading guns of 110 tons weight, which will fire a shell of 1,800 pounds weight with a charge of 900 pounds of powder, the question of erosion becomes one of paramount importance. The 7 inch gun above mentioned was able to fire about 600 full charges before the bore had become so badly scored as to require its interior to be fitted with a new tube; this number of rounds was increased to about 1,000 by the introduction of an expanding copper gas check, fitted on the base of the projectile. The adoption of breech loading further increased the life of the gun by sealing the

muzzle loading scoring still more effectually; but on the other hand, it permitted the use of greatly increased charges of slow burning powder; and the extensive erosion now speedily produced in some of the heavier breech loading guns renders it probable that the interior surface of the 110 ton gun will require renewal after only a brief existence. Under these

circumstances, it becomes of very great importance to ascertain what material best resists erosion by powder products, or, what treatment of the material is best calculated to increase its powers of resistance to erosion.

UMBRELLA SUPPORT.

By means of this simple device, an umbrella may be attached to the side of a wagon, boat, baby carriage, etc., and held in any desired position. A clamp attached to the side of the boat is arranged to receive a tube held in position by a set screw. This tube may be placed in either of two sets of holes in the clamp, to hold it in a



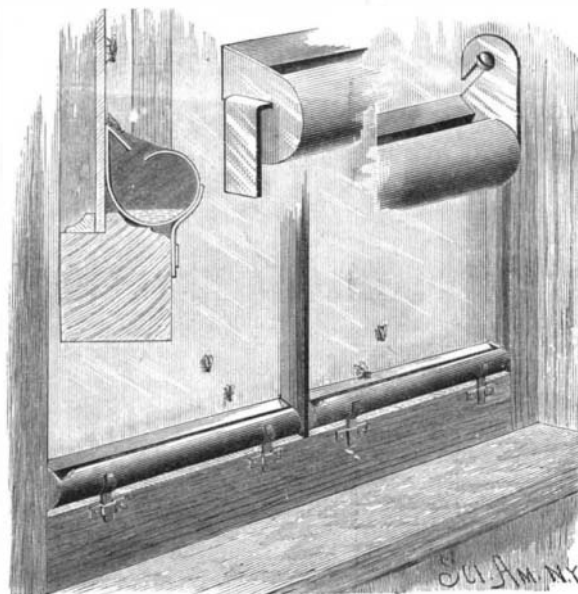
TOSSO'S UMBRELLA SUPPORT.

horizontal or vertical position. Near the upper end of the tube is a set screw, that holds a rod formed at its upper end with a right-angled arm provided with a disk serrated on one side. To this disk is clamped a similar one on an arm whose free extremity is concealed to fit the umbrella handle, which is retained therein by a clamp provided with a screw that presses against the back of the arm and secures the handle. It will be seen that the construction allows the placing of the umbrella in any suitable position for shielding the user from sun or rain.

This invention has been patented by Mr. Hippolyte Tosso, of 227 and 229 Decatur St., New Orleans, La.

FLY CATCHER.

The accompanying engraving represents a simple device for catching flies, which has been recently patented by Mr. Z. F. Xevers, of 208 Brannan Street, San Francisco, California. An approximately semi-cylindrical trough is provided with tongues, which are received in clips secured to the lower rail of the window sash, as shown in the large view in the annexed engraving. That side of the trough touching the glass is made plain, to fit closely against the glass, so that the flies on the window can readily gain access to the trough. Near the upper edge of this side is secured a strip, arranged so as to form a barrier, preventing the return of the flies to the glass. The trough is partly filled with a suitable fly-killing liquid. The left hand upper view is a cross section through the



XEVERS' FLY CATCHER.

lower one. The other two views represent different methods of holding the trough to the sash.

THE Great Eastern steamship has been converted into a show vessel, and for the first time since her construction is making money for her owners. The ship, which for several months has been on exhibition at Liverpool, has lately gone to Dublin, where she will stay for the winter. Only her screw propeller is now used.