

John C. Trautwine.

This eminent engineer, after a long and eventful career, died in Philadelphia in his seventy-fourth year on Friday, Sept. 14. He was born in that city March 30, 1810. After receiving an ordinary education he entered the office of William Strickland, and was engaged on the Delaware Breakwater. Later he was employed on the construction of the Philadelphia, Wilmington, and Baltimore, and the Hiawassee railroads. In 1844 he began a five years' engagement on the Canal del Dique, in New Granada. In 1849 he was engaged on the Panama Railroad as chief engineer, and later he made a survey for the Atrato Inter-oceanic Canal, and in 1857 he surveyed the route for the Honduras Inter-oceanic Railway, a line that was never built.

He is and will be best known, however, by his writings, which have run through several editions. His book on "Railroad Curves" is the simplest and clearest book on the subject in the English language. He also wrote a book on "A New Method of Calculating the Cubic Contents of Excavations and Embankments by the aid of Diagrams." The work, however, on which his reputation will chiefly rest is his "Civil Engineer's Pocket Book." It is a monument to his industry and versatility, and is perhaps the best single treatise on civil engineering thus far published. Owing to the time when Mr. Trautwine studied and learned engineering, his book was, even at the time of its publication, somewhat behind the times. It has fallen still further behind now, but it would be difficult to find any other one book which alone would be as useful to a young student of civil engineering as this.

While engaged in work in tropical countries Mr. Trautwine contracted one of the malignant fevers so prevalent in those climates, from the effects of which he never recovered entirely, and which finally caused his death.

He was a prominent member of several scientific societies. He leaves two sons, William Trautwine, a conveyancer, and John C. Trautwine, Jr., who has been engaged with his father in his book work—*Railroad Gazette*.

Old Steel Pens.

Says the New York *Sun*: "Pens are made of the very finest steel, and can be remelted and used again for many purposes. They can be turned into watch springs and knife blades, and can be dissolved and made available in the manufacture of ink. The suggestion is made that the children of the poor should be taught to collect cast-away pens, and thereby save valuable material and earn money."

The steel from which steel pens are made is so thin that it can be torn like stiff paper. It goes through such tormenting processes in the rolling, cutting, pressing, slitting, and forming, that it is a wonder that enough of energy is left in to stand the bath of fire, water, and the subsequent heat of the annealing furnace to have any of the original life of the steel left in it. And, in fact, there is little of the *vivre* of the original metal left when the steel pen has done its brief duty. It would be much more sensible to gather up the oxidized scales from about the smith's anvil for making into "watch springs and knife blades" than to collect rejected steel pens for these purposes.

IMPROVED QUILTING FRAME.

The Davis quilting frame is the subject of a patent issued February 6, 1883, to H. T. Davis. It is intended as a convenient substitute for the old-fashioned, cumbersome quilting bars, which required an entire room, necessitated the gathering of the feminine neighborhood, or encumbered the house for a week. Mr. Davis' invention permits the use of any sewing machine, and by its means a quilt or a comfortable may be finished by one operator in two or three hours. The bars of the frame are of brass pipe or of iron pipe japanned or bronzed; the frame stands on two light legs, and may be retracted or expanded at will, and when not in use it may be stowed away, occupying but little space. The entire frame weighs but little over sixteen pounds, and, as seen in the engraving, it occupies but a small portion of the room. It is adapted not only for large articles, as coverlets, but also for cloaks, linings, skirts, and children's hoods—any article that requires stretching on a frame for quilting. These frames are made by the Davis Quilting Frame Company, 320 and 322 Broadway, New York city. Address as above for further information. See advertisement on another page.

Another Electrical Boat.

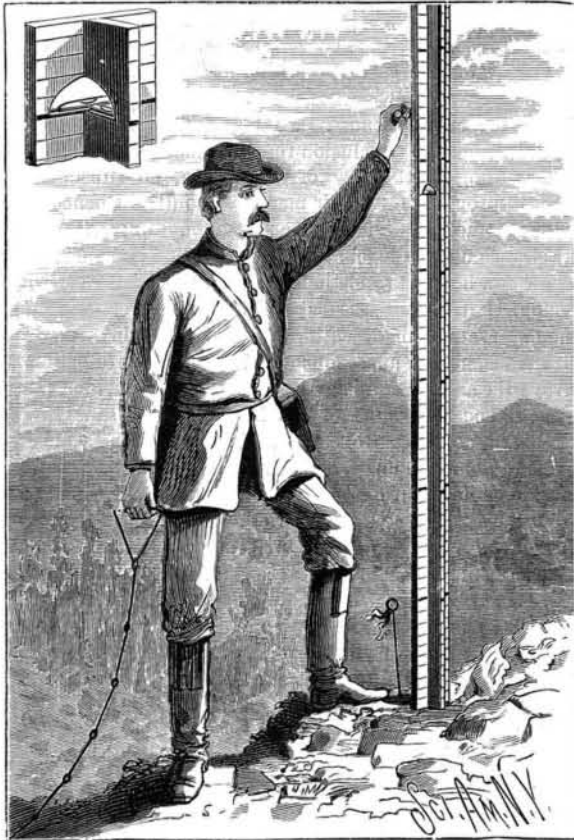
The *Moniteur Industriel* gives an account of the trial of an electric boat at Geneva on July 22. It was constructed by Messrs. Meuron & Cuénod, and was 20 feet long by 14 feet beam. The boat was driven for several hours at a speed of from $5\frac{1}{2}$ to $6\frac{1}{2}$ miles per hour, by three bichromate batteries of six cells each. The motor—which was on the Thury system—acted directly on a small two-bladed screw, there being no intermediate gearing.

THERE are in New York city 824 miles of gas pipes, 486 miles of water pipes, 391 miles of sewer pipes, $14\frac{1}{2}$ miles of steam supply pipes, and 15 miles of underground electric wires.

SURVEYOR'S LEVELING ROD.

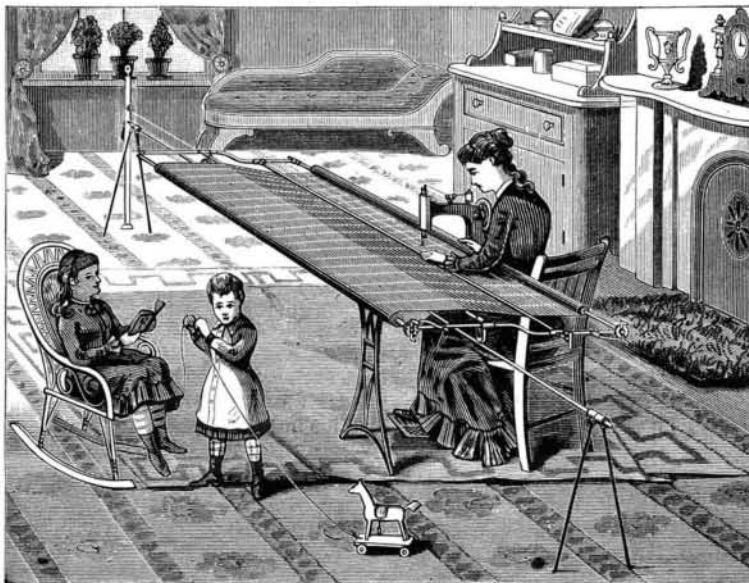
In this invention it has been the aim of the patentee to make the use of the telescope unnecessary by placing the rod in a vertical position, as compared with as many horizontal planes as there are divisions in the rod. The rod consists of a board marked with the usual graduations, and to its center is attached another board with its plane at right angles to the first. A cross section of the rod would be shaped like a T. The outer edge of the second board is graduated to correspond with the first.

In an opening in the first board is placed a small bulb level, and in a similar opening in the second board is another

**SURVEYOR'S LEVELING ROD.**

level. These levels are in the same horizontal plane, but at right angles to each other, and at such a height as to be conveniently watched by the rodman. To the back of the first board is attached a handle by which the rod is held in position. When the rod is in an exact vertical position, as shown by the small levels, elevations can be made at sight in explorations, or by the aid of a spy-glass or telescope without the use of a reticule, for the reason that the division on the edge of the second or central board, which is in the same horizontal plane as the observer's eye, will coincide with a division on the other board, the two uniting to form a continuous line, thus doing away with the horizontal line in the reticule. All of the remaining divisions will form broken lines.

The rod is light and convenient, may be made in two or

**DAVIS' IMPROVED QUILTING FRAME**

more pieces to obtain the desired length, and may be graduated by any system. With this rod the level can be modified by removing the leveling attachments and reticule, a horizontal and vertical movement being sufficient.

The rod has been patented by Dr. Jesus Muñoz Tébar, of Caracas, Venezuela.

Imitation Amber.

Roessler's recipe is to melt one part of rosin (colophonium), then add two parts, by weight, of shellac. When the mixture becomes sufficiently fluid one part of white rosin, that should be clear as water, is then added.

English Railways.

At a recent meeting of the American Society of Civil Engineers, a discussion by Mr. Charles Douglas Fox, of London, Corresponding Member of the Society, "On the Increased Efficiency of Railways," was read by the Secretary. Mr. Fox referred to the fact that English railway managers and engineers have long realized the great importance and economy of a thoroughly substantial road bed. The formation widths on their chief railways are now made 30 feet, both in cuttings and on embankments for the double lines, and very great care is taken to thoroughly drain this formation in cuttings by deep ditches on each side with earthenware drain pipes in them, and fill in with broken stone or other dry material. The ballast, consisting of broken stone, clean gravel, coarse sand, burnt clay, or ashes, is not allowed to be less than one foot in thickness below the bottom of the tie. For lines of constant and heavy traffic, the bullhead grade, double headed rail, having a large top member for wear, and a very small bottom member, is found to be the best section for steel rails. The weight of these rails is 84 pounds per yard. The chairs are from 40 to 46 pounds each, and the rails are secured in them by keys of compressed oak. The tendency of the English companies is to expedite traffic, both passenger and goods, not by higher rates of speed, but by reducing the number of stoppages.

The traffic lines are gradually quadruplicating their tracks—in some cases throughout, in others by sidings seven miles in length. There is a very general feeling in England in favor of identifying the driver with his engine, and holding him responsible for its working. On some lines the name of the driver is conspicuously attached to the engine. Mr. Fox forwarded also the railway regulations of the English Board of Trade, which give very minute directions in reference to the construction and running of railways.

Progress of Sorghum Sugar Manufacture.

The new Kansas Sugar Refining Company, located at Hutchinson, Kan., turned out its first batch of sugar on the 12th of September. This company has invested \$125,000 in works here, and proposes making its headquarters at Hutchinson, while they will establish branch mills over the State and ship the product here for refining. The result so far to-day settles all controversy about the possibility of making sugar from sorghum cane. The run to-day was a bright grade, and crystallized perfectly without the sorghum taste. The mill will be run from this on at a full capacity, which is over one hundred barrels per day of sirup. This season's product will aggregate 9,000 barrels of sugar and 7,000 barrels of sirup. All grades of white sugar will be made, but the machinery for granulating is not up yet. To run this mammoth establishment requires two hundred men day and night. The *Cleveland Leader* says the works at Hutchinson and at Sterling are both operated on the same principle, and both have met with the same successful result. Hutchinson and Sterling will soon be able to supply Kansas with her sugar.

Artificial Nourishment.

Some of our foreign exchanges relate a novel method for administering nourishment to invalids and persons with weak digestion which, it is alleged, has been practiced in Paris with great success. Diseases and enfeebled health commonly owe their origin to the imperfect assimilation of food. When the digestive functions are impaired the body is insufficiently nourished, and is unable to resist the encroachments of disease. For the maintenance of health and for restoration in sickness it is of the first importance that the food be not only of the most nourishing kind, but that it be administered in a form easy of digestion and assimilation. In a paper recently communicated to the Medical Hospital Association of Paris by Dr. Debove, he describes a form of alimentation which has attracted much attention. His system is to apply nourishment in form of powder instead of in bulk. Uncooked meat, from which the fat has been removed, is minced finely and allowed to dry in an oven at about 90° Centigrade until it becomes perfectly hard without being burnt. It is then reduced to impalpable powder by pounding in a mortar and passing through a fine sieve. The powder so obtained represents about four times its weight in flesh. The fiber and the large percentage of water contained in flesh are thus removed, and the essential properties of the meat retained and presented in a form the least difficult to digest. Other alimentary substances, such as lentils, beans, peas, etc., can be prepared in the same way.

In cases of consumption the treatment is said to have proved marvelously successful, and in general debility and nervous disorders, arising from weakness, restoration is rapid and permanent. A few spoonfuls of the powder are equal to the meal of a person with a healthy appetite. The powder, when bottled, will keep an indefinite time, and may be taken with a little milk, gravy, wine, water, or other liquid.

GALVANIZED iron pails for drinking water should not be used. The zinc coating is readily acted upon by water, forming a poisonous oxide of zinc.

Philadelphia International Electrical Exhibition.

An international exhibition of electrical appliances will be opened in Philadelphia on September 2, 1884, under the auspices of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts. The project has been recognized by Congress, which passed an act, approved by the President, providing for the admission, duty free, into the United States of all articles for exhibition only. Judging from the success that has attended similar exhibitions in Europe, the fact that it is the first of the kind held in America, the high position occupied by American electricians, and the eminent reputation of the institution having the matter in charge, the project will have a prosperous issue. Any information concerning it can be obtained by addressing the Secretary, Franklin Institute, Philadelphia, U. S. A.

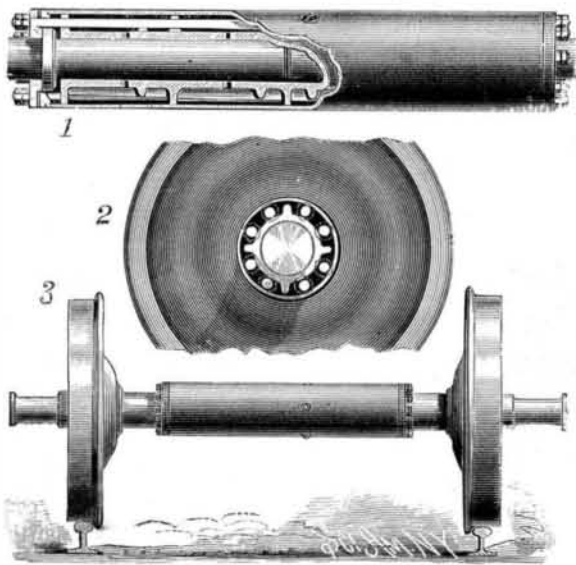
How Cholera is Bred and Spread.

In a communication to the *London Daily News* Dr. William B. Carpenter suggests that Professor Tyndall's doctrine that cholera germs are bred in the human intestines, and from them by means of excrement are diffused, does not go far enough in assuming by implication that the human intestines are the only breeding place of cholera germs. Dr. Carpenter gives three remarkable instances as evidence that cholera, or at least the almost equally fatal choleraic diarrhoea, was caused by offensive piggeries, by a retarded drain in marshy ground, and by a compost heap of unnamable filth in an unused yard. The outbreak of fatal disease in each of these cases was directly traced to these sources, the effluvia being borne on the wind. In each the disease was successfully combated and finally conquered by a removal of the filthy cause.

CAR AXLE.

By this invention the sliding of the wheels upon the rails of steam and horse railroads, and the consequent strain, wear, and loss of power are prevented. The axle is of either steel or iron, and is made in two parts, the wheels being attached in the ordinary way. The two parts of the axle are placed in line with and abut against each other, and have collars formed upon them near the wheels, as shown at the left in Fig. 1. Upon the adjacent parts of the axle and between the collars is fitted a cast steel or iron sleeve, formed with flanges around its ends, intermediate points, and center, and with four ribs upon its outer surface, extending from the center flange to the end flanges. Upon the flanges is shrunk a wrought iron sleeve, the ends of which project a little beyond the ends of the inner sleeve, so as to overlap the collars. Steel rings, rabbeted to receive the ends of the wrought iron sleeve, and of a diameter sufficient to allow the collar to pass, are placed at each end. Upon the axle at the outer sides of the collars are steel rings, made in two parts, and between these rings and the rings on the wrought iron sleeve are inserted a number of thin sheet metal washers, by the removal of one or more of which the end wear of the parts can be taken up.

The parts are held together by long bolts which pass through holes in the outer steel rings and through recesses in the flanges of the inner sleeve. In the outer sleeve are a number of openings, closed by screw plugs, some one of which will always be upward when the axle is at rest, to allow oil to be readily poured into the space between the

**MEEHAN'S CAR AXLE.**

sleeves. As the axle revolves, the ribs on the inner sleeve, and the long bolts, raise the oil which passes through the bolt recesses in the flanges to the space at the ends of the inner sleeve, where it comes in contact with the axle and collars. The oil also passes through openings in the inner sleeve and along longitudinal grooves in the inner surface of the sleeve, so that the entire frictional surface of the axle is kept lubricated. From the above description and the engravings it will be seen that either wheel with its connected part of the axle can move independently of the other, and by reason of the long bearing surface thus secured, no appreciable wear of the parts is possible.

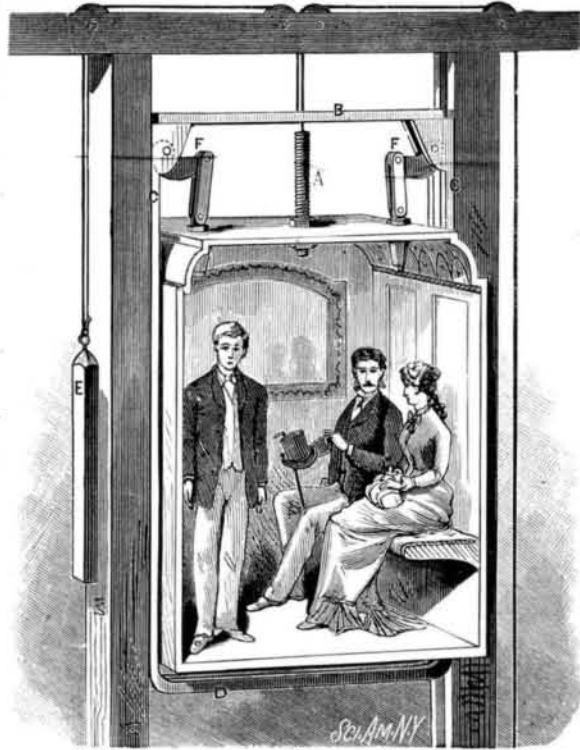
This invention has been patented by Mr. Thomas Meehan, of 27 Park Row, New York.

SAFETY STOP FOR ELEVATORS.

Considerable ingenuity has been displayed in devising means of arresting elevator cars in case of accident to the hoisting rope or machinery, but in spite of that many accidents have occurred for want of a really efficient stop.

We give an engraving of an improved safety stop for elevators recently patented by Mr. William Whitely, of Housatonic, Mass., which is very simple and at the same time seems to embody the elements of success.

The elevator car is guided by tongues on the vertical beams in the elevator well in the usual way, and is supported by a wire rope secured in its sleeve, A, projecting

**WHITELY'S SAFETY STOP FOR ELEVATORS.**

through the top of the car and fastened by two nuts, one above and the other below the top of the car. This arrangement of the sleeve and nuts admits of regulating the tension of the rope, by adjusting the nuts surrounding the car; there is a frame consisting of a crossbar, B, side pieces, C, and a crossbar, D, connecting the side pieces under the car. This frame is connected by a rope with the weight, E, which nearly counterbalances the frame and supports it partly above the elevator car. In grooves in the side pieces, C, are pivoted cams, F, connected by links with bolts extending downward through the car top, and fitted with rubber springs to relieve the shock of stopping the car. So long as the hoisting rope and machinery act normally, the frame and its cams will move with the car; but should the hoisting apparatus give way, the car falling faster than the frame brings the cams, F, to bear against the timbers at the sides of the well with sufficient pressure to arrest the car and prevent further accident.

A Remarkable Ice Well.

BY H. C. HOVEY.

A remarkable well exists on the premises of Mr. Levi Allen, at Horse Plains, Missoula County, Montana. This well was dug to supply a steam saw mill, situated on low grounds, distance three-quarters of a mile from the Pond Orelle River, in what seems to have formerly been the bed of the stream, although the ground is now solid and firm. At the depth of 35 feet a strong current of air was encountered, sufficiently strong to extinguish a common lamp or candle. The digging was continued to the depth of 45 feet, and then a steam pump was fixed reaching to within 15 feet of the bottom of the well.

Last September the well began to freeze up, and as it was important to keep it from doing so, Mr. Allen had it thoroughly banked with saw dust. The process, however, went on until by the last of November it was frozen solid. The mill has now been idle for several months. About the 1st of July the proprietor went down to see the condition of things, and found "two feet of solid ice in four feet of pump!" He would like an explanation of this surprising state of things, and to know what can be done to make his well serviceable.

The latter inquiry cannot be properly answered without a more exact knowledge of the locality. Quite possibly a new well sunk a few feet from the first one might be free from ice. Plainly the strong current of air comes from some hidden cavity of large size. In exploring caverns it is invariably found that when a strong draught is observable through a narrow aperture, it indicates the proximity of some large chamber. A new well, by escaping the aperture, would be exempt from the cause producing the ice.

The phenomenon is not unprecedented by any means, although not very frequently observed in this country. Ice wells have been found in Vermont and New York, and their peculiarities described by Silliman and Hitchcock. An ice cave may be seen at Decorah, in Iowa, which is fully described in White's Geological Report (vol. i, p. 80). The ice caves of France and Switzerland are numerous, and an account of them has been published by Rev. G. F. Browne

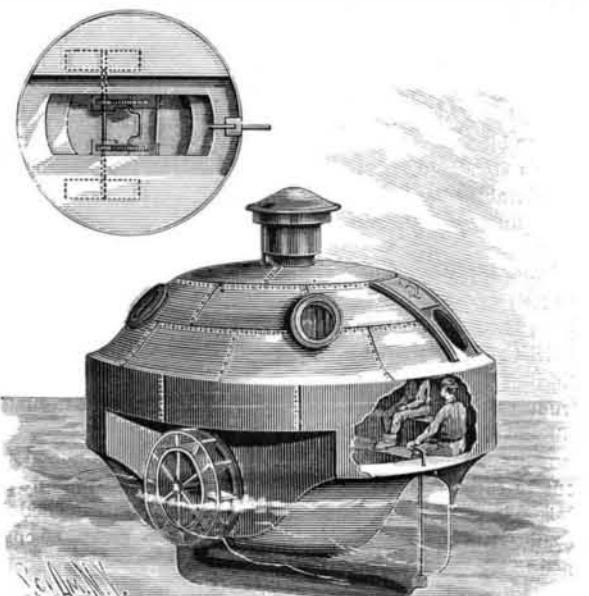
From an ice cave on the Peak of Teneriffe a great ice supply is annually obtained for ships; which, being columnar in structure, melts less readily than the ordinary sort, and is therefore especially suitable for transportation. One of the largest of these natural ice houses is in the Carpathian Mountains, near the village of Stelitze, and is resorted to in midsummer to supply the wants of the villagers. At that season the roof is covered with icicles, and the drops falling to the sandy floor are instantly congealed. On the approach of winter the icy mass is said to begin to dissolve; and by Christmas it is gone, leaving the cavern warm and dry till spring returns, when the ice forms anew! Ice has also been known to form in very deep mines, for instance in the Imperial salt mines at Iletski, in the Ural Mountains. Here there is a series of natural hollows in the gypsum, where, when the weather is hottest, the ice hangs in solid masses, that melt away again amid the rigors of a Russian winter.

Several different theories have been brought to explain this class of phenomena. It has been suggested as a cause that nitrous earth dissolved by flowing water makes a freezing mixture; that waves of cold set in motion in winter fail to penetrate the crust of the earth till the next summer, and that warm waves are likewise retarded until the following winter; that the heavy cold air sinks into subterranean recesses, whence the light and warm air fails to dislodge it; and that currents of air, blowing through caverns, produce intense cold by the simple process of evaporation. This latter theory looks the most plausible, and would readily account for the frozen well of Montana.

Still another theory, however, may be mentioned—that suggested by Prof. Lowe, in a paper read before the Boston Scientific Society, in 1879. His theory, suggested by the action of what is known as the Frizzel air compressor, is, in brief, that bubbles of air drawn into water flowing down through fissures in the rock are liable to a continually increasing pressure, compelling it to part with latent caloric, which it immediately absorbs from the water on being liberated in any cave or well or mine. This process may sometimes be sufficiently active to reduce the water to a frozen condition, from which it would be relieved whenever the flow was arrested by surface freezing, drought, or any other cause. Possibly there may be two or more of these conditions in combination in Mr. Allen's well, making the water in it remain unaffected by common climatic changes. It is to be hoped that he may continue his interesting observations, and report them from time through these columns.

LIFE BOAT.

The hull of the boat herewith illustrated is preferably made of sheet iron, and in its characteristics differs much from the common boat. The horizontal sections are circular, with the exception of a segment, which is cut away from each of the two sides to admit the paddle wheels. The sides of the boat next to the wheels are vertical, and the floor of the boat over each wheel serves as a seat or storage room inside. A cut water, a keel, a stern post, and a rudder are formed outside of the circular contour. The hull of the boat is provided with sides forming a vertical cylinder, and with a nearly spherical roof joining the upper edge of the cylinder. Around the roof are sealed lights, and in the center is a cupola perforated for ventilating the interior. At one side of the roof is a sliding door, for entrance and exit, which is made water tight by packing. The interior is

**HAMILTON'S LIFE BOAT.**

provided with seats, and straps and buckles are secured to the wall to draw over the bodies of occupants to sustain them in very rough weather, and loops are placed below the seats for the passengers to thrust their feet into. The paddle wheels are attached to short shafts provided with pinions into which engage spur gears mounted on a crank shaft revolving in bearings secured to the boat, the crank extending across the hull in a location to be conveniently worked by the occupants. This boat may be carried by ships and used to escape from them in case of accident. A large number of persons with the necessary provisions may be carried in the roughest water without danger.

This invention has been patented by Mr. Tobias Hamilton, of Centrefield, Ohio.