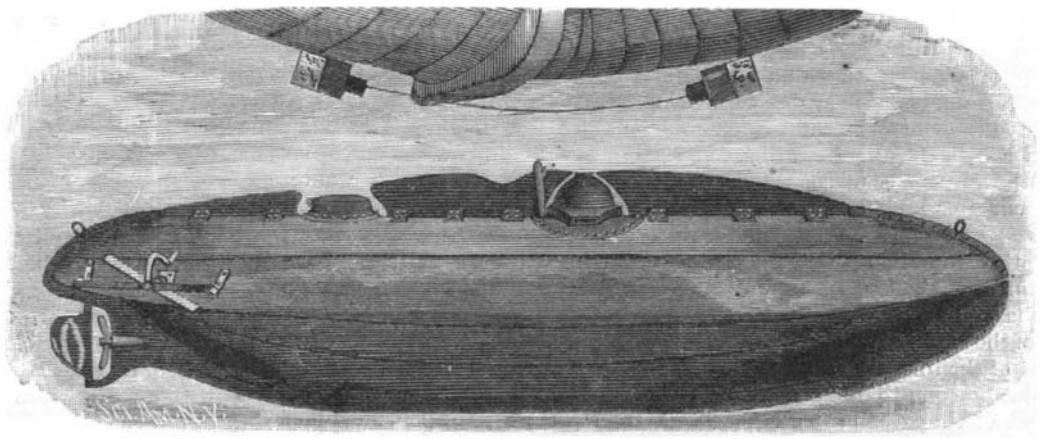
THE SUBMARINE MONITOR PEACEMAKER.

The subject of the illustrations accompanying this article is a small vessel that has attracted much attention during the last few months. It is a submarine boat designed for use in placing torpedoes under the bottoms of war vessels. It is the design of her owners, The Submarine Monitor Company, Fifth Ave. and 23d St., N. Y., to construct a larger vessel, to be provided with many additional improvements. Yet the little Peacemaker has obtained such success that, if the new craft does any better, it will be a subject of congratulation for those interested.

The Peacemaker is thirty feet long, seven and a half feet wide, and six feet deep. Many months have passed since we first described her. She has been changed in many respects since that period, and her efficiency has been the subject of numerous trials. Her name grimly suggests her mission. It is by her destructive powers to make marine warfare impossible at least as regards harbors or waters near ports.



THE PEACEMAKER LEAVING A VESSEL.

In the original plan, the captain of the boat wore a diver's helmet and body piece. His head and upper part of the body projected above the deck of the vessel. This has now been changed. The present craft is provided with a small sighting dome, nearly amidships, and projecting fourteen inches or more above its deck. The captain stands directly under this, with his head in the dome. Four windows of plate glass, just large enough for his eyes to see through, permit his vision to range through the whole circle. As the presence of ships overhead has also to be made manifest to those within the boat, a bull's eye is set in the top of the dome. As she runs under a ship it can be discovered by this aperture. A pair of watertight sleeves and gloves are connected to the deck near the dome, so that external objects can be manipulated from within.

Among the accidents to which she was liable, one seemed peculiarly obvious. It was that by collision with some submerged object the dome, massive as it is, should be carried away. If this occurred, the boat would fill with water and sink. To avoid this danger, the boat is provided with a central fin extending the length of her deck, and rising about as high as the pilot's dome. This was designed to act as a fender, and it has proved a most valuable improvement. In its center it is provided with a notch or depression to catch the keels of vessels.

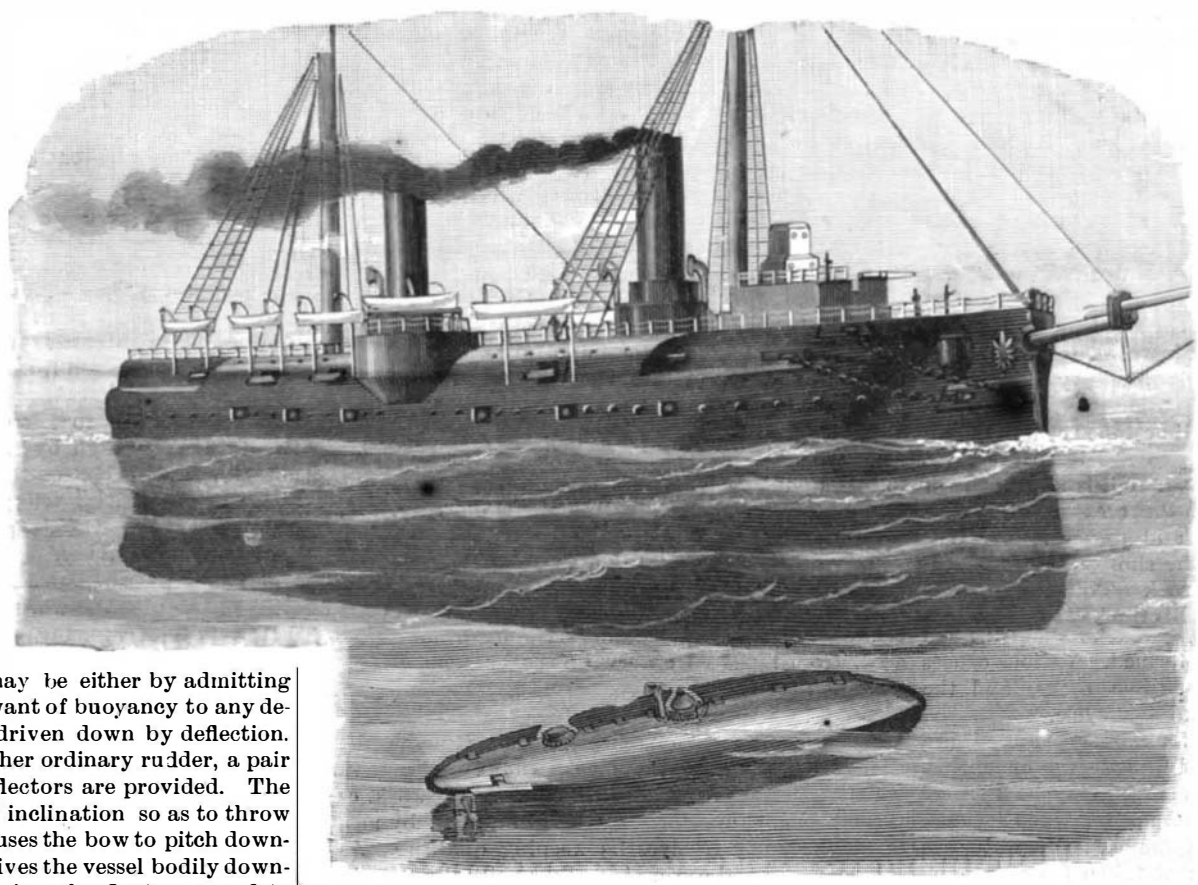
Her deck is also to be provided with torpedo gear for discharging floating torpedoes. The proposal is to release a pair of these engines attached to each other by a cord, and provided with cork floats, and electro-magnets, and electric detonators. When released, these will rise, one on each side of the keel of the vessel to be destroyed. A current of electricity is kept passing through the magnets. The instant they come in contact with the iron bottom of a war vessel, they will adhere with great tenacity. The Peacemaker, after placing the torpedoes, will steam away, and when at a safe distance explode them by electricity.

Her methods of sinking may be either by admitting water, so as to descend by want of buoyancy to any desired depth, or she may be driven down by deflection. At her stern, in addition to her ordinary rudder, a pair of horizontal rudders or deflectors are provided. The pilot can vary the angle of inclination so as to throw the stern upward. This causes the bow to pitch downward, so that the engine drives the vessel bodily downward. On stopping the engine, she floats upward to the surface in a few seconds. She is provided with pumps and all ordinary accessories of a vessel.

The great difficulty in submarine navigation has been to obtain an available source of power. In the Peacemaker, the Honigman soda boiler is used.* A reservoir for the reception of a strong solution of caustic soda represents the fire box. In this the boiler proper is immersed.

On starting out the boiler is filled with hot water. A strong solution of hot caustic soda, whose temperature may be nearly 500° F., is run into the tank. This soon generates steam. A fourteen horse power Westinghouse engine is used to drive the screw. The exhaust steam is blown into the soda solution. As it combines with the caustic soda it generates a great quantity of heat, thus replacing a fire and generating steam in the boiler.

Thus it will be seen that steam is the motive power of the boat. This is her strong point. Electricity has been tried, but has proved unsatisfactory. Any form of manual power is insufficient. Ordinary steam generators would rapidly exhaust the air. The soda boiler not only has none of these disadvantages, but also insures the presence of enough caustic soda to keep the air pure.



THE PEACEMAKER APPROACHING A VESSEL.

As the men are hermetically inclosed, some means in extended cruises will have to be adopted to purify the air. This is a very simple problem to solve. A cylinder of oxygen will be used to supply the gas as exhausted. As fast as carbonic acid gas is formed, it will be absorbed by caustic soda. Finally, a little chloride of lime or permanganate of potash will destroy organic impurities exhaled by the occupants.

Electric lights for illuminating the interior are used, as they do not contaminate the air.

Such is a brief description of what is termed the most successful submarine vessel ever constructed. The writer enjoyed a trip in her, and was much impressed with the ease with which she was handled. As her bow pitched down, the sensation of running down the incline was most peculiar, in addition to which a forward impetus of the body was felt, due presumably to the deflectors.

A pressure gauge is used to indicate the depth to which the vessel descends. In the ordinary trial trips, a depth of forty to fifty feet is attained.

The new Peacemaker is to have two sets of boilers, one for surface and the other for submarine use. She will have soda regenerating apparatus also, so as to be in some sense an independent cruiser, and not a mere tender on some larger craft.

* See SUPPLEMENT, No. 483.

A NEW fluid for preserving museum specimens, so as to keep their color, size, form, and consistency for several weeks, has been devised by Professor Grawitz. It consists of 150 grms. of sodium chloride, 20 grms. of saltpeter to 1 liter of water; to this is added 3 per cent of boracic acid.

Filtration of Water.

At a recent meeting of the German Congress of Naturalists and Physicians, Dr. Plagge read a memoir on the filtration of water, in which he argued that the essential task of filtration is to free water from infectious matters. As such matter consists chiefly of bacteria, the value of a filter must be judged according to the efficacy in the destruction or removal of the bacteria present in the water. The distinction of the bacteria into pathogenous and non-pathogenous is here unimportant, since a filter which allows the non-pathogenous germs to pass will not keep back those which are pathogenous, while, on the other hand, we are justified in assuming that a filter which keeps back all other bacteria will give protection against infectious matters.

Most of the ordinary domestic filters, and especially those containing as their material spongy iron, carbon, stone, gravel, and cellulose, do not—according to the author's observations—come up to the above requirement. On the contrary, there is generally found a marked increase of organisms in the filtering material. Experiments made with pure cultures of typhus and cholera prove that such filters allow these infectious matters to pass without hindrance. Better results were obtained with clay and asbestos filters of different constructions (Chamberland, Breyer, Olschewsky, Arnold, and Schirmer), as for a certain time they yielded water perfectly free from germs. However, it was not found practicable with any of these apparatus to obtain water perfectly free from microbia. According to Hesse, asbestos strongly compressed, and especially dense cells of clay, form a filtering material which yields water permanently germ free. On this point the author is for the present unable to decide, since these apparatus have not been produced for practice, and he has not been able to procure such.—*Chemiker Zeitung.*

Deer Hunting with Steam.

One morning in October, while running his train over the Delaware division at a high speed, about two miles this side of Parker's Glen (New York), Engineer Merritt Turner saw a handsome buck deer on the track about a quarter of a mile ahead of him. The track at this point runs for miles along the side of the mountain, its precipitous sides being on the south side and the Delaware River on the north, 30 feet below the level of the track. The deer could not climb the mountain, and evidently did not relish the idea of making the 30 foot jump; so it increased its speed, and bounded away down the track ahead of the approaching train. Engineer Turner took in the situation, and, throwing his engine wide open, started after the affrighted animal. It was lungs and wind against steam and axle grease, and the latter won. The deer was overtaken, and the locomotive threw the poor creature with great force against the rocks, fatally injuring it. The trainmen cut the animal's throat, threw the carcass on the pilot of the locomotive, and took it to Port Jervis. The trainmen feasted on venison for a week.

A New Remedy for Asthma.

Pyridine is, according to the *Union Medicale*, valuable as an anti-asthmatic, whether the affection is of cardiac origin or otherwise. About a drachm of the drug is placed on a plate in a small room, to which the patient pays periodical visits, of from twenty to thirty minutes' duration, three times a day. After two or three *seances* the rales in the chest disappear, the expectoration is more free, and sleep is obtained at night, or, at all events, relief from the asthmatic attacks. In some cases the improvement is permanent, in others it only lasts unimpaired for five or six days. Iodine treatment is then required, which is usually efficacious, but which cannot be borne by all patients.