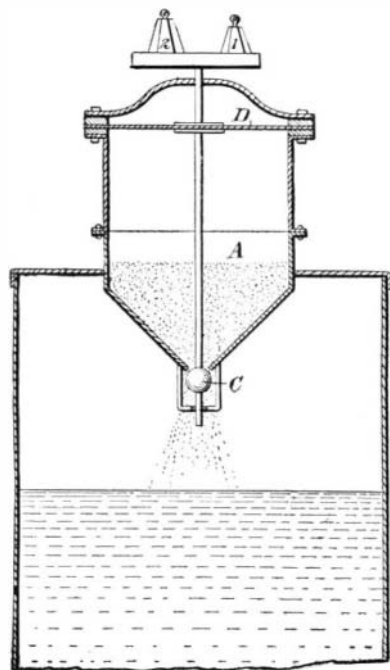


equipped with a system of this kind made in compact form and placed inside the helmet. To keep up the respiration of one person during an hour required but 0.2 to 0.3 pound of oxylythe.

No doubt the most important application of artificial air is that to submarine boats, and it is in fact to this end that the efforts of the inventor have been mainly directed. The Minister of the Marine has taken an active interest in the matter and a number of experiments are now being made at St. Denis, near Paris. These relate to two different points, first to the question of respiration when the submarine is under water, and next to the use of a petrol motor with a supply of artificial air, in place of an electric motor with accumulators. As to respiration, allowing

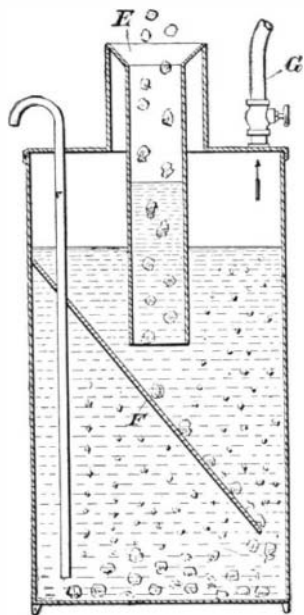
10 persons for the equipage, 2 pounds or more of oxylythe will maintain the respiration of the crew for one hour, representing a cube of 4 inches of the compound. A supply for a long period is thus contained in an insignificant volume. A still more novel idea is to utilize the oxygen for supplying the petrol motor when used under water. In the present systems such a motor can only be used at the surface. When submerged, accumulators are



JAUBERT LABORATORY OXYGEN GAS GENERATOR.

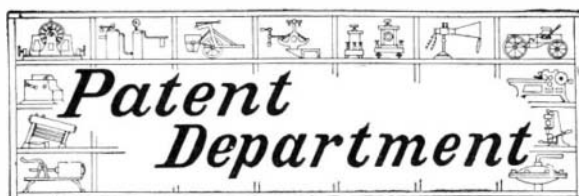
generally used, which drive an electric motor. The weight of the battery is, of course, very great for the amount of power which it furnishes, this being estimated at 150 to 200 pounds per horse power, not to speak of the large amount of space it takes up, just where space needs to be most economized. By using a petrol motor supplied with oxylythe the weight of the latter is but 5 to 10 pounds per horse power. The distance to which a submarine can travel when submerged is, of course, limited to the weight of battery it carries, and is very small; by using a corresponding weight of oxylythe the range would be enormously increased, due allowance being made for the supply of petrol and difference of motor weight. The petrol motor here has its exhaust connected with a discharge-

box and thence to a scrubber and an oxygen generator. The oxygen consumed in the motor is here renewed in the right proportion and the product is ready to be used again. This forms a closed cycle, out of contact with the air; when the boat is at the surface, a simple arrangement of valves allows the air to be used and the generator is shut off. The motor can be run while submerged for a period depending only upon the supply of oxylythe (and petrol) which is carried. Another point is that the resulting mixture is richer in oxygen than the air, and the output of the motor may be increased 25 to 30 per cent. Motors



FORM NO. 2 JAUBERT OXYGEN GAS GENERATOR.

using heavy petroleum work especially well with the oxygenated mixture and much better than with air. The experiments now being made with petrol motors near Paris are very interesting, but have to be kept secret for the present. It may be stated that a large petrol motor of about 130 horse power, such as may be applied to a submarine, is being tested in this way. The exhaust gas passes into a cylindrical oxygen-replenisher about 7 feet high and 3 feet in diameter and other apparatus, and is then returned to the motor, where it is recarbureted and used over again. These experiments have been quite successful and will no doubt be practically applied to a submarine of the "Goubet" type before long.



ODDITIES IN INVENTIONS.

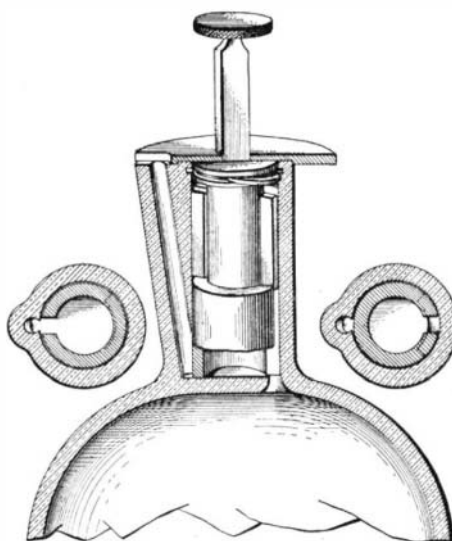
LIFE PRESERVER.—Two inventors in Switzerland have designed a life preserver which not only prevents drowning, but will also sustain life for an indefinite period, and, further, is equipped with a sail by means of which a shipwrecked person may make his way to a passing vessel or eventually reach shore. A hollow tank fastened to the back serves to keep the person



LIFE PRESERVER.

afoat, and a provision and drink chamber is fitted on the chest. This chamber is divided into three compartments, the lowest containing drinking water, the next an alcoholic stimulant, and the third serving as an air chamber to support this weight. Access to the water and stimulants may be had through tubes which lead up within easy reach of the mouth. Condensed food is carried in three tins on the top of the water tank. A compass also is here secured, to which may be fastened a chart of the course the wrecked vessel was pursuing. A number of blank cartridges and a pistol are also provided for use in attracting attention, and a signal of distress floats from the mast-head. Surely the shipwrecked mariner thus equipped need have little fear of Old Father Neptune.

NON-REFILLABLE BOTTLE.—A recent invention by Mr. James Y. Payton, of Waldron, Ark., provides a non-refillable bottle of an entirely new type. Fitted snugly in the lower portion of the bottle neck is a hollow dispensing cylinder divided at one side by a slot. A piston having a rib for engagement with this slot is adapted to slide freely in and out of the cylinder. A shank of the piston passes through a cap-piece which

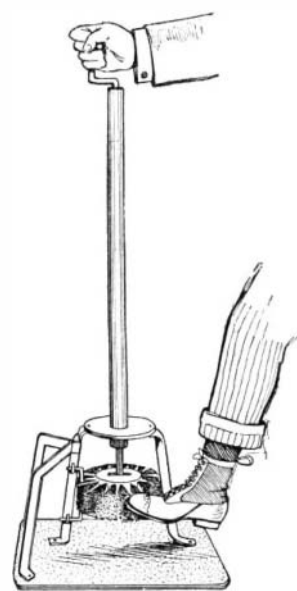


NON-REFILLABLE BOTTLE

prevents the removal of the parts from the bottle. The cap-piece is held by spring dogs snapped into an angular groove in the bottle neck. This groove is provided with shoulders which permit turning of the cap and plunger in one direction only. The operation in dispensing the liquid is as follows: The plunger is forced down into the chamber and then turned until a tooth on the plunger engages a rib formed in the neck of the bottle. This act brings the slot of the dispensing cylinder into registry with an opening in a bottom

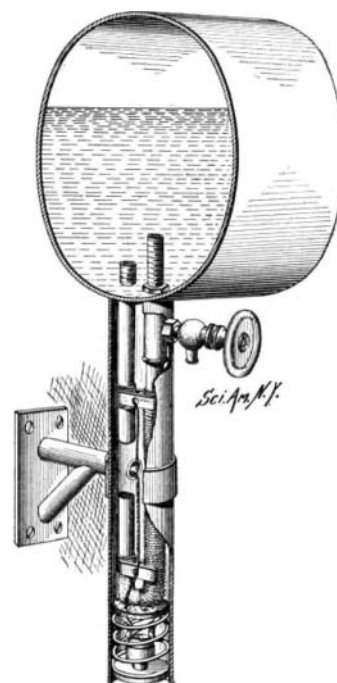
wall which separates the neck from the main body of the bottle. The plunger is now raised to the position illustrated, when the tooth will clear the rib formed on the bottle neck, and the bottle is then inverted, permitting the liquid to fill the dispensing chamber. A half turn of the piston now brings the rib formed thereon into engagement with the rib on the bottle and the slot of the dispensing cylinder into registry with an outlet port which extends upward into the form of a tube to the mouth of the bottle. The cap-piece by the same act is turned so as to uncover the mouth of this port. The liquid may now be freely poured out of the dispensing cylinder. Before the dispensing cylinder can be turned to its refilling position, the plunger must again be forced in so that the rib formed thereon may pass under the rib of the bottle. This it will be seen prevents refilling of the bottle because the plunger would force out any liquid contained in the dispensing chamber before the latter could be turned into registry with the opening in the bottom wall of the neck.

SHOE-CLEANING MACHINE.—We have long been in need of a shoe-cleaning device which would not only scrape the mud off the soles of shoes, as with the ordinary scraper, but would also remove mud and dust from the uppers. These requirements are met in the shoe-cleaning machine recently invented by Mr. William Richardson, of Colfax, Wash. The machine comprises a number of scrapers which are used to give the shoe a preliminary cleaning, and a rotary brush for rapidly and thoroughly removing all dirt. This dirt is removed from bristle tufts of the brush by a rod against which the brush is rotated, so that clean bristles constantly operate on the shoe. As the brush wears off, this cleaner-rod may be adjusted inwardly to effectively engage the bristles.



SHOE-CLEANING MACHINE.

ELECTRIC WATER-HEATER.—For persons desiring a quantity of hot water on short notice, the water-heater here shown will prove particularly valuable, though it will be found useful on all occasions requiring hot water. The device is designed to rapidly heat flowing water, or if used in connection with a reservoir, to heat water circulating therefrom and thus store up a quantity of hot water. The reservoir or water tank, as shown, is provided with two pipes connected at their lower ends by a U-shaped coupling. One of these pipes, which is provided with means for heating the water contained therein is longer than the other pipe, so that as the water is heated it will flow to a higher level in the tank and the cooler water will pass down through the shorter pipe, thus keeping up a circulation. A discharge cock is connected with the hot-water pipe, through which the water may be drawn off as required. The heating device consists of a fine wire, wound in coils about the pipe, the latter being covered with an insulating coat of mica or other equivalent insulating substance. The wire offers a high resistance to the electric current passed through it, and sufficient heat is thus generated to heat the water. The heat of the wire cannot rise much beyond that of the pipe, because of the continuous circulation of water, so that no fear may be entertained of burning out the wire. The circuit can be closed or opened by operating the plug at the bottom of the device, which is adapted to slide between two spring contact pieces forming the terminals of the heating medium.



ELECTRIC WATER-HEATER.