is supported in the box, and its armature lever has rearwardly projecting lugs engaged by a bar connected with the curved upper portion of the lever beneath the check-receiving slot. Pivoted in the box is a lever carrying a plate with the words "early," "late," "closed," the extremity of the lever being slotted to receive a curved wire projecting from the bar carrying a counterweight. Fig. 3 shows the magnet and indicator. A conveniently located clock has a dial in which are holes to receive contact pins, which also pass into corresponding holes in an insulated ring at the back of the dial, one hole being opposite each hour mark and another fifteen minutes beyond the hour mark, and pins inserted through the holes into the ring being touched by the hour hand. The insulated ring and the clock movement are electrically connected with the magnet in the casing and a battery. When the pins are inserted in the dial, a check dropped in the slot before the hour for commencing work is passed from the chute to a receptacle outside the box, the indicator then exhibiting the word "early." When the hour hand arrives at the hour at which work begins, the curved lever beneath the slot is tilted to deflect the check into a compartment of the drawer, the indicator then showing the word "late;" but in fifteen minutes after the first contact, when the hour hand reaches the second contact, a check cannot be inserted, and the word "closed" is exhibited by the indicator, the apparatus remaining in this condition until it is reset.

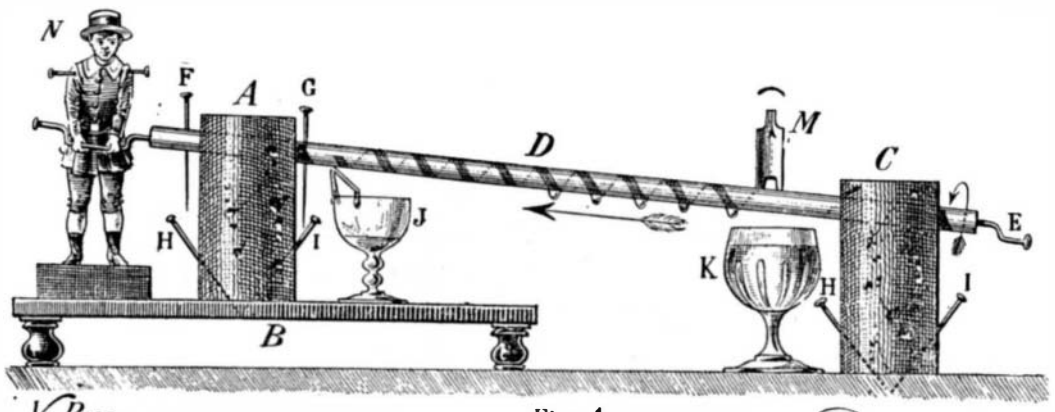

Fig 1.

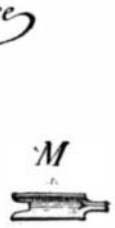

Fig 2.

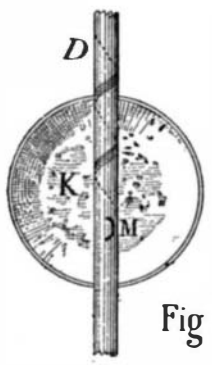

Fig 3.

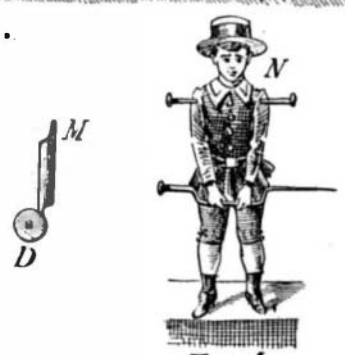

Fig 4.

ARCHIMEDEAN SCREW MADE FROM SIMPLE MATERIALS.

An Old Horse's Memory.

Eleven years ago a horse was purchased for the fire engine Portland No. 2, on Munjoy Hill. This horse was called Old Tom, and it helped draw the engine for six years and was then disposed of. It has been drawing an ash cart of late years, and the other day went by the engine house. Engineer Loring, who knew the horse well, since they came to that engine in the same year and were there together for six years, fell into conversation with the driver and told him that he hadn't a doubt that if the old horse was put in his old stall, and the gong was sounded, he would rush for his place in front of the engine just as he used to do. The driver doubted this, and they agreed to try it. The old horse, now fifteen years old, was put in his old stall, where he had not been for five years. At the first sound of the gong he started for his old place under the harness in front of the engine. He tried to go quickly, but made only a sorry exhibition of nimbleness compared to his former habit.—Portland Daily Press.

THE AUTOMATIC LIFE SAVING APPARATUS OF DE ROPP.

M. De Ropp has utilized the liquefaction of gases in the manufacture of a life preserver. The apparatus gives the wearer entire liberty of movement until the moment arrives when the life preserver is required. It consists of a belt or sack of rubber which is normally flaccid and pliable, but which receives at the desired moment a quantity of liquid methyl chloride which, on expanding, is sufficient to completely inflate the sack. The liquefied gasis contained in a small flask terminating in a fine point which is introduced into the sack. A knife is held in place by a spring which is kept in position by a ring of filter paper which is destroyed on coming in contact with the water. The knife actuated by the spring, on being released by the band of paper, falls on a glass point, breaking it. The liquid then escapes into the sack, and, assuming the gaseous state, completely inflates it. The device can be disguised so as not to be noticeable. The inventor has also devised a signal for use by shipwrecked persons. The apparatus of M. De Ropp was experimented upon for the first time in the laboratory of M. Raoul Pictet. For our engravings we are indebted to La Nature.


Fig. 1.—LIFE PRESERVER BEFORE INFLATING.

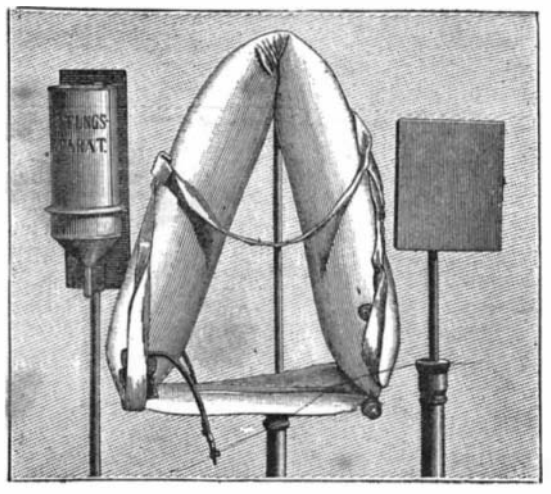
Fig. 3.—APPARATUS FOR TESTING THE LIFE PRESERVER.

Scientific Enthusiasts.

It is a common error to think of science as opposed to all the poetry of life and scientists as the most cold and matter of fact men. In reality the true scientist is almost always a poet at heart, and the greater he is the more certain is he to be a pure enthusiast and of a deeply reverent spirit. Kepler, exclaiming in the moment of his great discovery, "O God, I think thy thoughts after thee!" is a type of this.

Professor Farrar, who occupied the chair of natural philosophy at Harvard University two-thirds of a century ago, was a man possessed of this enthusiasm for his work, and was beloved by his pupils, whom he inspired with something of his own spirit.

One day the class entered the lecture room and found the professor walking backward and forward with kindled eye and working face, holding a ball in his hand. Presently he stopped and confronted the class and exclaimed, suiting the action to the word:

"I toss this ball into the air; the earth rises up to meet it and the stars bow down to do it reverence!"

Probably no member of the class who heard these words ever forgot their absolutely accurate lesson—that action and reaction are equal; that the apple which falls to the earth at the same time draws the earth to itself in the exact ratio of their relative weight, and disturbs even the course of the planets and stars. Still less could they forget the grandeur and unity so vividly expressed in that brief imagery.—Youth's Companion.

AN ARCHIMEDEAN SCREW CONSTRUCTED FROM SIMPLE MATERIALS.

To perform this simple experiment take a long lead pencil, preferably an unvarnished one, and place it through two pierced corks, as shown in the engraving, one cork being placed higher than the other. The corks are adjusted so that the pencil turns freely. A bent pin, E, serves as a crank. The pencil is pierced by two other pins at F and G, which limit the motion of the pencil. Pins H and I hold the two corks firmly. A vessel of water, as a goblet, is placed at J, and another at K. The elevation of the glass, J, must be greater than that of the glass, K. On J is placed a bent match whose lower end is split to fasten it to the goblet. It is adjusted to almost touch the pencil. Then take a pen and cut it as shown in Fig. 2. This pen is forced into the pencil as shown in Figs. 1 and 3. Now fill the glass, K, with colored water so that the course of the water will be made more apparent. The colored water in K is now to be transferred to J, by the medium of the pencil, D, which acts as an Archimedean screw after the pencil has been scored spirally with a pair of pliers. The spiral begins at the pen, as shown in Fig. 3. Now turn the crank, E, in the direction shown by the curved arrow. The pen dips in the water and on rising carries a drop with it which is at last deposited at the beginning of the spiral. The drop is forced to follow the spiral until it strikes against the match. It then runs down into the glass, J. At each turn of the crank a drop is forced upward. If it is desired to render the experiment more comical, a paper or other kind of doll may be secured to the upper crank at N. For our engravings and description we are indebted to La Science en Famille.

A Large Cargo Steamer.

The Hamburg-American Steamship Company has ordered from Messrs. Harland and Wolff, of Belfast, a twin-screw steamer of 20,000 tons burden, i. e., only 3,000 tons less than the Great Eastern. The vessel, when completed, will be the largest in the world. It is to be chiefly employed for freight, but will also be able to accommodate 200 cabin and 1,500 steerage passengers. The order has been given to a British yard, as its tender was more moderate than those of the German shipbuilders, and as the former contracted to deliver the vessel in 10 months, while the latter demanded to be allowed 19 months. The chief German dockyards are, it is stated in explanation, overwhelmed with work at the present moment.

OIL stoves and gas stoves should never be kept burning in a sleeping room, for they are burned in the open air of the room, and, having no connection with a chimney flue, they throw the poisonous carbonic oxide of combustion into the air of the apartment and make it unfit for respiration. Even an oil lamp is dangerous if left burning all night, but an oil stove is worse, because stoves generally feed more flame, consume more of the oxygen and give off more poisonous gas.


Fig. 2.—LIFE PRESERVER AFTER INFLATING.

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