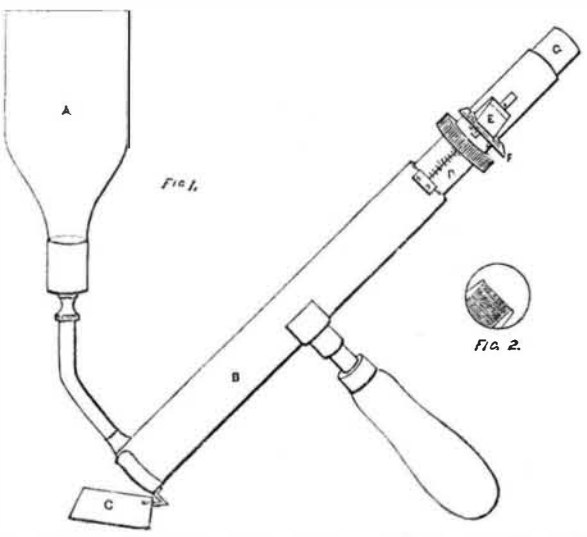
TESTING THE COLOR OF WATER.

Dr. Bowditch has recently devised an apparatus for testing the depth of color of different specimens of water, which is described in a report upon the purity of the different rivers around Boston, etc. (City Document No. 142).

The instrument consists of two tubes, B and D, sliding, watertight, one within the other, the lower end of each tube being closed with a disk of plate glass. Into the large tube, B, just above the plate glass disk, is inserted a piece of small tubing, which terminates in a funnel-shaped receiver, A. Water poured into this receiver will, therefore, pass into the space between the two glass disks, entirely filling the outer tube when the inner tube is withdrawn, and again returning to the receiver when the inner tube is passed down, so that



the glass disks come in contact with each other. Through an opening, near the upper end of the smaller tube, is inserted one end of a rhombic prism, E, in which total internal reflection takes place twice. This prism extends halfway across the inner tube, so that an eye, looking through the eyepiece, sees the field of vision nearly half filled by the surface of the prism (see Fig. 2).

The eyepiece, G, contains a single lens, which is focussed upon the upper surface of the prism. The position and angles of the prism are such that a ray of light, outside of and parallel to the tube, B, is reflected first directly into the tube, D, and then parallel to its axis, thus emerging from the prism and entering the eyepiece alongside of the rays of light which have passed through the two plate glass disks. I will thus be seen that the conditions for comparing the color and intensity of these two sources of light are as favorable as possible.

A piece of white card, C, fastened at the lower end of the larger tube, throws a uniform white light through both tubes, and also along the outside of the instrument into the prism.

In using the instrument, a piece of brownish yellow glass is placed in front of the prism, and the water whose color is to be determined is poured into the receiver.

The inner tube is then withdrawn until the column of water between the two glass disks is sufficiently long to give to the light passing through it a color equal to that imparted by the colored glass to the light passing through the prism. The length of this column of water, which will, of course, vary inversely with the depth of the color, can be determined by means of the scale on the inner tube. By this means the relative intensity of color of various specimens of water may be determined with considerable accuracy. Dr. Bowditch thinks that this instrument might also be of service in connection with chemical color tests.

Gems from the Keely Motor.

"An ordinary steamship can be run so fast with it that it would be split in two."

"With these three agents alone (air, water, and machine), unaided by any and every compound, heat, electricity, or galvanic action, I have produced, in an inappreciable time, by a simple manipulation of the machine, a vaporic substance, at one expulsion, of a volume of ten gallons, having an elastic energy of ten thousand pounds to the square inch."

"It is a vapor of so fine an order that it will penetrate metal. It is lighter than hydrogen and more powerful than steam or any explosives known."

"I found this vapor capable of exerting power infinitely."

"I once drove an engine 800 revolutions a minute, of forty horse power, with less than a thimbleful of water, and kept it running fifteen days, with the same water."

"I produced a pressure of about 28,000 lbs. to the square inch in a shell of a gallon and a half capacity and three and a half inches thick."

"I experimented with a gun. The target was a 4 inch plank placed against a steel plate. My vapor threw the ball with such tremendous force that it went through plank and steel, tearing the bullet in shreds."

"I propose, in about six months, to run a train of thirty cars from Philadelphia to New York, at the rate of a mile a minute, with one small engine, and I will draw the power all out of as much water as you can hold in the palm of your hand. Why, people have no idea of the power in water. A bucket of water has enough of this vapor to produce a power sufficient to move the world out of its course."—*John W. Keely, in Inter-Ocean.*

"You treat the alleged invention of Mr. Keely," says Charles B. Collier, "contemptuously, and speak of him and his confederates as juggling tricksters whose chief purpose appears to be the wriggling of money out of silly people."

"I have given to the development of this invention my almost undivided time, having meanwhile to beg the indulgence of clients for whom I have charge of important causes; my declared policy having been to attest by my actions the confidence I have professed in the genuineness and value of Mr. Keely's inventions, resting content to wait that moderate degree of fame and fortune which shall probably be mine, if the correctness of my judgment shall be vindicated in the future."

HOW THE MONEY WAS OBTAINED.

"The initial step was the procurement of the requisite amount of money."

"I visited your city, called together some of your best known and influential citizens, among whom was Charles H. Haswell, Esq., who himself had visited Mr. Keely's place, seen his receiver charged with this enormous vaporic pressure, and had reported upon it."

"As a result of my interview, the gentlemen present subscribed for $10,000 of the stock. They paid me $3,000. I returned to Philadelphia and gave this to Mr. Keely."

"Mr. Keely was obligated, before any further money was to be called for, to explain the principles of his invention. This he did, giving to me (in the presence of ten other gentlemen) an exhibition on the night of the 10th of November, 1874, the result of which I reduced to writing. This report you have evidently seen."

"Mr. Keely," says the report, "proceeded to make an 'expulsion,' that is to say, to develope a force or pressure from the multiplicator sufficient to exert a pressure of 1,430·36 lbs. This he did by blowing from his lungs, for, say, thirty seconds, into the nozzle upon the multiplicator. He then shut the cock and turned on the water from the hydrant. The operation was completed in about two minutes after the attachment to the hydrant was made, by simultaneously opening two cocks upon tubes connected with the first and second drums, when the lever and weight of the force register were raised. The operation of the engines now took place as follows:

"A short tube, carrying upon its end a reaction wheel or 'Barker's mill,' having two arms of about two and a half inches long each, was screwed upon the reservoir, and, at 9:03 P. M., was put into rotation at a very high velocity, by the manipulation of two cocks. At 9:05 P. M., the reaction wheel was removed, and connections applied to a small beam engine, which was rotated at 400 revolutions. At 9:08 P. M. the reaction wheel was again rotated until 9:09 P. M." The machinery was then stopped, and the gaseous fluid allowed to escape against a candle flame and blow it out. At 9:15, the engine was run again for a few turns. "At 9:17 P. M., the reaction wheel was run again, and at 9:20, the experiments being concluded, the multiplicator was taken apart and inspected by those present. There was no heat perceptible in any part of the apparatus."

"After I had written the report," continues Mr. Collier, "I submitted it to Messrs. Rutherford, Boekel, and Bell. They gave it their unqualified endorsement."

J. Snowden Bell says: "I now publicly and emphatically reiterate and reaffirm my endorsement of said report."

W. H. Rutherford says: "This report being submitted to me, I carefully examined it, and gave to it, and to the conclusions therein stated, my unqualified endorsement, and I now re-affirm the same."

"With this report," continues Mr. Collier, "I proceeded again to New York, and submitted it to the parties with whom I had contracted. They paid me the balance ($7,000) of the $10,000 subscribed."

"Under and by virtue of the several contracts, the parties were entitled to an exhibition of this power. This has been given to them, and was witnessed by about 30 gentlemen. As the result of such exhibition, the parties have paid an aggregate of one hundred thousand dollars."

Charles H. Haswell, civil engineer of this city, says.

"I have witnessed the development, by Mr. Keely, of a cold vapor, void of pungency or of temperature in excess of the surrounding atmosphere, having an expansive energy of fully 7,800 lbs. per square inch, as tested by my measurements and computations thereon.

"I have been present when Mr. Keely has applied a like vapor to an Ashcroft gage, and the index pointed to a pressure of 10,000 lbs. per square inch.

"I have satisfied myself fully and conclusively that the instrument of Mr. Keely was operated wholly independent of any external attachment, other than that of a chain suspension and a flexible connection with a water service pipe.

"I have seen a double cylinder engine, 3 by 3 inches, operated by a like vapor from a reservoir, through a conducting pipe eight feet in length, and having a bore of but one tenth of an inch diameter, although it was resisted by a friction load equal to 2,250 lbs. per square inch, and which engine I individually operated for a period of 15 minutes without any visible reduction in its speed, or indication of the exhaustion of the intensity of the vapor in the reservoir from which the supply was drawn."

[Capacity of the above reservoir not stated by Mr. Haswell, but fixed by Mr. Collier at 3½ gallons.]

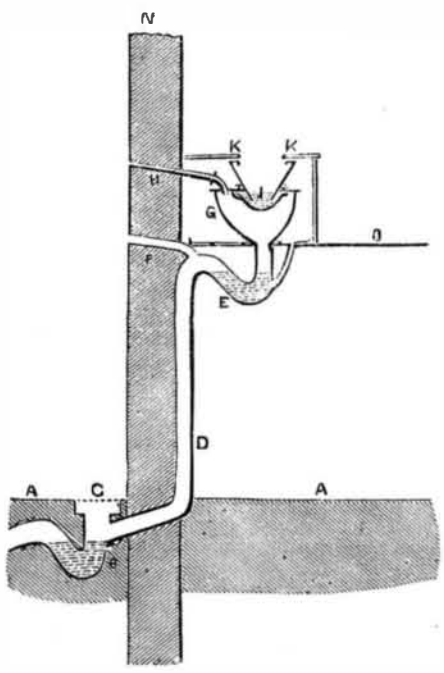
H. C. Sergeant says: "One of the remarkable things about the Keely motor is that it (the new vapor) cannot be transmitted at a lower pressure than 1,000 lbs. (per square inch). It can be used, of course, at a lower pressure, after it is put in action. It can be regulated like steam, but its transmission at less than 1,000 lbs. pressure causes its condensation."

The capital stock of the Keely Motor Company is $1,000,000. Among the New York gentlemen, believers in Keely, largely interested in the stock, and who are at present resident directors of the concern, are J. W. Shuckers, Charles Lamson, Frank G. Green.

"An ordinary steamship can be run so fast with it that it would be split in two."

HOW TO PUT UP A WATER CLOSET.

Our engraving represents sectional views of the water closet in the upper floor of a two story house. A A is the level of the surface of the ground at the back court and of the kitchen floor. B is a 6 inch vitrified fire clay siphon trap,



with an open iron grating, C, at its top, which grating may be hinged. D is a 4 inch soil pipe from the water closet; it is here shown coming down inside the wall; in other cases it may be carried down the outside. One advantage of such pipes being carried down the inside is that they are more likely to be protected from frost. F is an ½ inch or 2 inch lead pipe for ventilating the soil pipe. In this case it is carried through the wall, in other cases it may be carried up through the roof. G is the water closet trunk, made of iron, it being a pan water closet, which is here shown. H is a ¾ inch lead pipe carried through the wall and put in to ventilate the trunk, or that space between the water in the pan, I, or basin, J, and the water in the siphon trap, E. This ¾ inch ventilating pipe, H, is a very important one, and its use ought to be the rule in place of the exception, as is at present the case. It works as follows: When the handle of the water closet is lifted, then any foul air lying in the trunk, in place of coming out into the apartment, is sent outside with a rush through this pipe, H; besides, being open to the air, it tends to prevent the accumulation of such foul air in the trunk.

In order to keep the outer orifices of the pipes, F and H, always open, it is a good plan to solder on one or two pieces of copper wire across them. J is the water closet basin, and the two small circles shown, underneath K K, are the india rubber pipes. L is a 3 inch zinc ventilating pipe carried up through the roof to ventilate the space or inclosure in which the water closet is situated. M is the gas bracket right below it, helping, when lighted, to cause an upward current. The empty space at N is supposed to be the water closet window. O is the surface of the floor of the upper flat. No gas can accumulate in the soil pipe, for the pressure of the atmosphere on the surface of the open grating, C, tends to send a current of fresh air through the soil pipe and out at the ventilating pipe, F.—*W. P. Buchan.*

Recent American and Foreign Patents.

Improved Fire Escape.

Franklin P. Berney, San Quentin, Cal., assignor to Lee B. Mathews, of same place.—A box is built upon the roof of the building, and so placed that its front door may open at the wall of the said building. The box is also provided with doors at its inner side. Within the box is a reel on which a rope or wire ladder is wound. The ladder is made of such a length that its lower end may reach to the ground, where it may be secured to hooks attached to the pavement. When the doors are swung open, an arm pushes a ball from a pin, so that the ball may fall into the street and carry down with it the end of the cord or chain, by which the ladder may be drawn from the reel. The doors are swung open when unfastened by springs. The doors are fastened, when closed, by a sliding catch bolt. The bolt is operated by a rod or chain, which passes down along the wall of the building through a guard pipe attached to said wall.

Improved Running Gear.

Henry Backer, Union Hill, N. J.—By this invention the connection between the head block and the forward axle is made firm and secure without the use of a fifth wheel. The end parts of the axle between the ends of a strengthening bar and the axle arms are strengthened by bars, placed upon them, and secured by suitable fastenings.

Improved Blacksmith's Forging Hammer.

Andrew J. Judson, Hillville, assignor of three fourths his right to Jacob Truly, Catfish, Pa.—This consists of a sledge hammer for blacksmith's use, contrived with a foot treadle for forcing it down and a spring for raising it. It will strike quite light blows, or slower heavy ones, at the will of the operator. The helve of the hammer is pivoted in a yoke of a vertical standard, which is free to turn, and has a lever for the purpose of swinging the hammer laterally along the anvil, whereby the blacksmith may cause the hammer to strike on any part of the anvil at will, and as the work requires. The springs for raising the hammer are also contrived to turn with the helve, so as not to interfere with its turning, and the helve is extensible to lengthen and shorten its range.