## THE MOST IMPORTANT AMERICAN DISCOVERIES AND INVENTIONS.

### No. 6.

### THE PLANING MACHINE.

### Woodworth.—1826.

None but a carpenter who has spent weeks of hard work in smoothing the floors of a building with a jack-plane can appreciate the boon conferred upon mankind by Woodworth's invention of the planing machine.

This great invention was made by William Woodworth, of Hudson, N. Y., during the winter of 1826–7. The idea of substituting machinery for hand labor in dressing lumber was conceived by Mr. Woodworth in early life, but he had not sufficient funds to construct a working model, nor indeed sufficient leisure to mature the plan in his own mind. In December, 1826, he was disabled for work by having his hand injured in the machinery of a block manufactory, and during the leisure resulting from this he brought his long-contemplated invention to maturity. He finished his drawings, but several months elapsed before he was able to make arrangements for constructing a working model. At length Mr. James Strong, of Hudson, agreed to carry the matter through for one-half of the invention. Steps were taken to secure a patent, and the construction of a working model was commenced. The machine was completed sufficient for trial in August, 1828, and after being tried in Hudson it was taken to the city of New York, where it was subjected to a series of experiments, and perfected. The patent was granted Dec. 27th, 1828.

This machine, like Whitney's cotton-gin and most other of those great inventions which are the product of a single mind, came complete from the head of the inventor. No material change has ever been made in the important parts of the mechanism, and the hundreds of machines that are now roaring from morning till night in their hard labor, are of essentially the same construction as the one first made from Woodworth's drawings.

A number of sharp knives are secured to the periphery of a rapidly-revolving wheel, beneath which the board is passed from end to end; the cutters in their revolutions taking off chips so short as to leave the surface perfectly smooth. When matched-boards are desired for floors or ceilings, a tongue is formed upon one edge and a corresponding groove upon the other by cutters of the proper form secured to the peripheries of disks at the edges of the board.

The patent for this invention was twice extended, first by the Commissioner of Patents, and second by Act of Congress. The right to the second extension was sold by the heirs of the inventor for $50,000. It is estimated that the saving to the country by the machines now in operation is not less than $6,000,000 a-year.

## THOMSON'S COMBINED BAROMETER AND THERMOMETER.

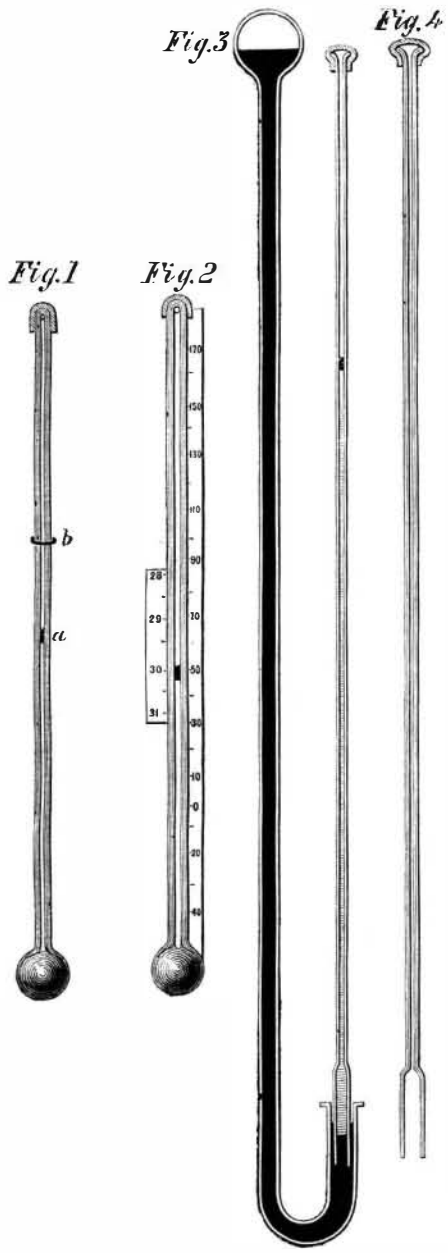
### A BAROMETER ON A NEW PRINCIPLE.

It is roughly estimated that the atmosphere extends from the surface of the earth upward about 45 miles, but there are no means of ascertaining its extent with any degree of accuracy. Notwithstanding, however, the fact that the depth of the atmosphere is unknown, the weight of a column of any given size—a square inch for example—and extending in length from the surface of the earth to the upper limits of the air, whatever that hight may be, can be determined with the utmost precision.

If a tube, closed at one end, is exhausted of air, and the open end is immersed in any liquid, the weight of the air resting upon the surface of the liquid outside will force the liquid into the tube upward until this interior column is just equal in weight to a column of air of the same size, and reaching upward as far as the atmosphere extends. A tube thus prepared and furnished with a suitable scale is called a barometer; from the Greek *baros*, weight, and *metron*, a measure.

It is found by experiment that the weight of the atmosphere will sustain a column of water about 34 feet in hight, or a column of mercury about 30 inches in hight; mercury being 13½ times heavier than water. As a column of mercury an inch square and 30 inches long weighs about 15 lbs., it follows that a column of air an inch square and reaching from the surface of the earth upward to the boundaries of the atmosphere must also weigh 15 lbs.

As the air is constantly moving about in currents, and as the watery vapor which it holds is constantly varying in quantity, the weight of the atmospheric column in any place is constantly changing. These changes are of course indicated by corresponding changes in the hight of the liquid column within the barometer tube. In this latitude, and at the level of the sea, the weight of the atmosphere sustains a column of mercury ranging from 27¾ to 31 inches in hight.




Mercury being the heaviest liquid known, barometers in which it is used are shorter and more portable than those made with other liquids; but even the mercury barometer is not very portable, as it must be at least 3 feet long, and, unless precautions are adopted, there is danger of spilling the mercury from the open cup whenever the instrument is inclined. Many efforts have consequently been made to devise a more portable instrument, and we here present an illustration of one which is, so far as we are aware, entirely novel in principle, and which it seems to us may possibly receive a more extensive application than is proposed by the modest inventor—a very rare circumstance.

Nothing can be more simple than the instrument here illustrated. It is formed of a tube, Fig. 1, in the cut, similar to the tube of a thermometer, open at the upper end, with a short column of mercury, *a*, which confines the air in the tube below it and in the bulb. The weight of the atmosphere presses upon the upper side of this short mercury column, while the elastic force of the confined air presses upon its lower side, and, as it slides freely up and down, it always occupies the position where these two forces are balanced. The pressure of the confined air would be constant if its temperature were constant, and in that case the position of the mercury would indicate correctly the weight of the atmospheric column. The inventor proposes no plan for keeping the confined air always at the same temperature, but he accomplishes practically the same result by always bringing it to a certain fixed temperature at the time of making the observation. This he does by simply placing the bulb in his mouth, when the air is brought to the constant temperature of the human body—98° Fah.

As changes in the weather are indicated, not by the actual weight of the atmospheric column, but by changes in that weight, this instrument is designed especially to indicate those changes, and therefore to serve as an exceedingly simple, cheap, and portable weather glass. To this end an elastic steel clasp or ring, *b*, is slipped upon the tube, and when an observation is taken, the ring is brought to the same part of the tube as the mercury; then when the next observation is taken, the position of the mercury, above or below the ring, will indicate an increase or diminution in the weight of the atmospheric column. If the mercury is above the ring the air has become lighter and rain may be expected, if lower, the chances are in favor of fair weather.

As the air in the bulb expands and contracts with changes of temperature, moving the mercury up and down, it is plain that by attaching a properly graduated scale, as shown in Fig. 2, the instrument, when the bulb is not in the observer's mouth, will indicate correctly the temperature of the air, and will thus become a thermometer as well as barometer.

The inventor suggests that where persons have deep wells with water of constant and known temperature, the bulb may be immersed in freshly drawn water, instead of being placed in the mouth of the observer, whenever the weight of the atmospheric column is to be measured.

Fig. 3 illustrates an improvement designed by the same inventor for multiplying the indications of the mercury barometer. A tube, Fig. 4, open at both ends, with the lower end enlarged, and partly filled with colored alcohol, has its lower end inserted in the open cistern of mercury. It will be seen that a rise or fall of the mercury in the cistern will be accompanied by a corresponding rise or fall in the surface of the alcohol, as much greater in proportion as the enlarged part of the tube is greater than the capillary bore.

A patent for these improvements was granted to John Thomson, of Wayne, Dupage county, Ill.; who may be addressed for further information in relation to them.

## The Mississippi Valley Sanitary Fair.

This fair will be opened at St. Louis, on the 17th of May; and the Committee make an appeal for donations in behalf of said fair. Large sums of money have been contributed throughout the Eastern States to the funds of the Sanitary Commission, which will be applied to relieve the wants and to make comfortable the soldiers of our army in the tent, the hospital, and upon the field. The soldiers of our army—East and West—are alike subjects of the proper care of the Government and the people; and no needed comfort should be withheld from them. Something more, therefore, is required to supply all the necessities that will soon exist in the South-western army; and the St. Louis fair is designed to promote this object. We trust, therefore, that there will be a liberal response to the appeal of the Committee. They ask for contributions in money, merchandise, articles of curiosity, relics, books, pictures, agricultural and mechanical implements, live stock, products of the farm dairy—indeed anything that will attract attention or command a sale.

Contributions in money may be sent to John P. Yelverton, President of the Bank of North America, this city. Goods and packages should be directed to J. E. Yeatman, St. Louis, Mo., with the name of the donor; and two bills, giving value of articles, may be sent to Mr. Yeatman or to Messrs. Pratt & Fox, 20 Cliff street, this city.

PATENT LANTERN.—On page 269 of the current volume we published the claim of F. W. Woodward's patent lantern. It should read G. W. Woodward, whose address in this city is No. 286 Greenwich street.