IMPROVED ADDING PENCIL.

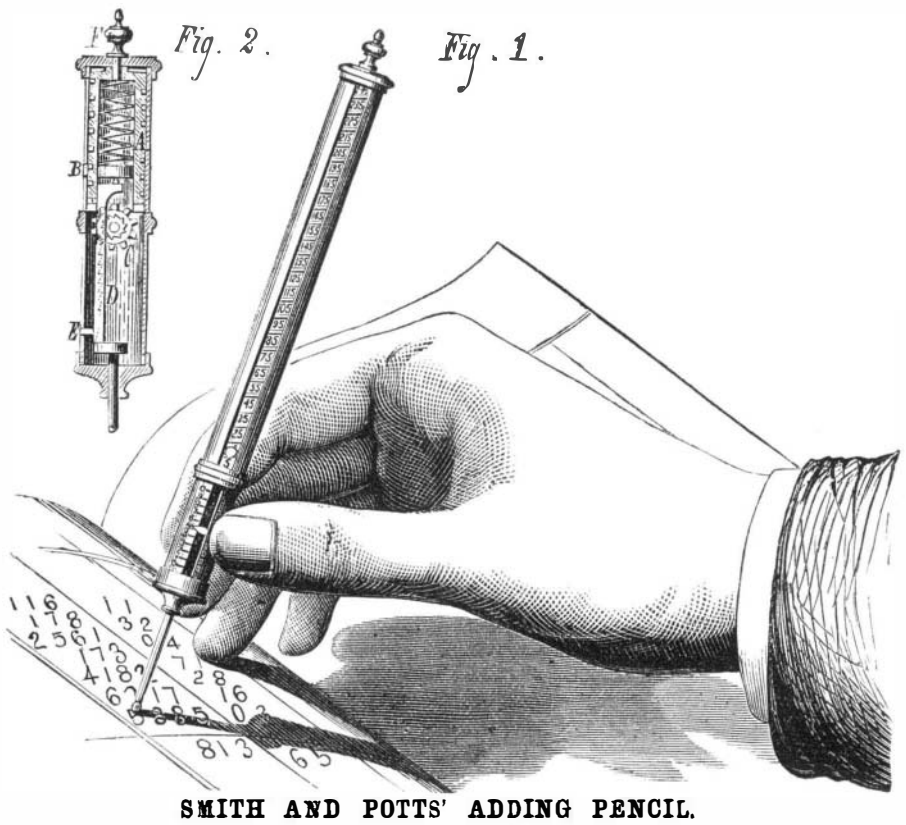
We illustrate herewith an ingenious and quite useful invention, the object of which is to facilitate the labor of accountants in adding up long columns of figures. It is a miniature calculating machine, which performs its work with unfailing accuracy and without requiring any thought on the part of the operator, other than that involved in noting that a pointer points to the proper figure to be added. In shape it resembles a pencil, being no larger, and as easily manipulated.

As shown in the hand in the engraving, the device has a metal case which is provided with a longitudinal slot. Within the case, represented in section in Fig. 2, is a cylinder, A, grooved spirally, and having figures, marked beside the grooves, ranging from 1 to 700, this last number being considered as probably as large as any one column of figures in a ledger will aggregate. In the groove, which serves as a guide, is an indicator, B. Below the cylinder is a pinion, C, the teeth of which enter similar teeth on the lower edge of the cylinder, so that when the pinion is turned the cylinder rotates within the case. The pointer of the pencil is connected, inside the case, with a rack, D, upon which is an indicator, E, working in a separate slot and ranging along a scale marked with the digits. The teeth of the rack engage with a wheel attached to the pinion when the rack is pushed up, but not when the rack is forced down by the reaction of the spiral spring within the cylinder.

In adding a column of figures, the operator presses the point upon the first number until a corresponding number is noted by the digit indicator, E; thus, in the engraving, the point is pressing on 5, and the indicator shows the same number. This, of course, involves the pushing up of the rack and the turning of the pinion, the revolution of the cylinder, and the consequent guiding of the indicator, B, a short distance up the spiral groove, said distance being in proportion to the total length of the spiral groove, as 5 to 700. The operator then raises his point, the spring forces the rack back, without turning the cylinder, so that the digit indicator returns to 0, while the upper indicator remains at 5. The next figure, 6, in the column is touched, and the digit indicator is carried to 6, the upper indicator is carried forward as before, but starts from its present location, namely, 5, so that at the end of its movement it will have traversed a total distance of 11, denoted by the numbers placed on the cylinder. This operation is repeated for every figure of the column; and when all have been touched, their sum is shown by the position of the indicator, B. By turning the piece, F, and rotating the cylinder in the opposite direction, the indicator, B, is now carried back to zero, ready to begin a new column; or if there be any number to carry from one column to another, instead of being set back to zero, it is adjusted to that number, so that that is added in, as it should be, with the next sum.

It will be seen that there is simply no possibility of error in the operation, unless the user deliberately sets the digit indicator, E, to the wrong number. A little practice will enable him to cause that indicator, however, to stop at the right figure almost instantly, so that the column will be cast up nearly as quickly as he can touch the separate figures and, as claimed by the inventor, much quicker than the average arithmetician can perform the same mentally. Interruption during the computation is no annoyance, and, indeed, the motion may proceed almost mechanically while engaged in conversation. Or he may stop work in the middle of a column, attend to other matters, and resume it after any period of time. So long as the pencil is not altered in the interval, the results will be absolutely correct.

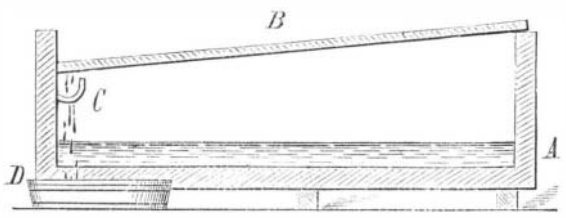
Patent pending through the Scientific American Patent Agency to Messrs. Marshall M. Smith and Fletcher W. Potts, of Verdi, Washoe county, Nevada. Patents are also being secured in foreign countries. For exclusive right for United States, State rights, and other particulars, the inventors may be addressed as above stated.



SMITH AND POTTS' ADDING PENCIL.

CHANGING SALT WATER TO FRESH.

A simple device is described in *Les Mondes* for changing sea water into drinkable water, which deserves to be widely known, and which might be the means of saving an immense amount of suffering to people wrecked at sea. The necessary portions could easily be got together before abandoning a ship and taking to a raft. The engraving given herewith, prepared from the description, will render the latter more clear. A shallow box, A, is made, 14 feet long, 2 feet broad, and about 6 inches deep. The sides are an inch or more thick and well caulked. Into this, salt water is poured to an inch in depth, and glass, B, is laid over the top at an inclination of an inch and a half. A channel, C, is added below the lower edge of the glass. Window sashes, such as are used for cabin windows or skylights, will answer the purpose as well as sheets of glass, care being taken to cut away the framing, so as to make wood and glass, on the underside, level.



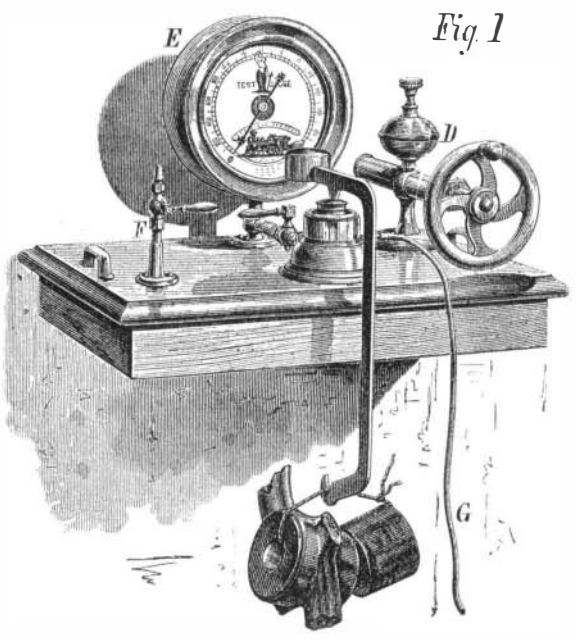
The device is exposed to the sun, and the effect of the rays is to evaporate the water, which condenses on the under side of the glass, flows down into the channel, and is caught by a vessel, D. After condensation the water of course is fresh. It is stated that, with a glass 3 feet 2 inches square, 2 gallons of fresh water per day may easily be condensed, under a hot sun, from salt water.

German Fish in American Waters.

Although the efforts to import shad eggs from this country to Germany have thus far proved unsuccessful, such has not been the case with the attempts to transport German fish hither. The North German Lloyds steamer Hermann recently brought to this port sixty carp and forty golden tench, in fine condition, only one fish having died on the voyage. The travelers were met at the wharf by Professor Baird, of the United States Fish Commission, who placed them in tanks of fresh water and sent them to Druid Hill Park, in Baltimore, Md., where they now are. The fish are mostly yearlings, and it is intended to keep them in their present location, using them for breeding and distributing them throughout the warmer waters of the Southern States. The experiment is one which pisciculturists are watching with the liveliest interest, since the carp especially is a very valuable fish for the table. The first distribution will be made, it is expected, in about a year.

WOOD'S PATENT SQUARE-INCH TEST VALVE.

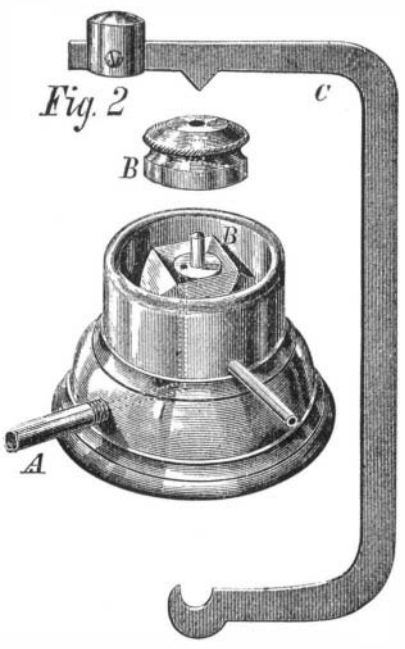
To introduce the below described invention with remarks about the general unreliability of steam gages, and the disastrous consequences attributable to false indications by the same, would only be to rehearse facts with which every engineer and steam user is fully conversant. No man, we believe, has ever had charge of a steam boiler, even for an hour, without thinking that, on the correctness of the needle quivering on the dial before him, the safety of himself, of others, perhaps of millions' worth of property, depended; and if such thoughts should father the desire to know the certainty of the gage, such would be but the result of his natural instinct toward self-preservation. Put into that man's hands, however, a simple device by which, in five minutes, he can assure himself that the instrument is absolutely correct, and one cause, and that perhaps the most prolific of boiler explosions, the false gage, is rendered impossible.



The usual method of testing gages, by means of the test gage and pump, is reliable only so far as the test gage itself is free from error; it is not an absolute trial of the instrument under examination, as is claimed to be the case when the novel device, represented in the annexed engravings, is employed. The principle of the invention is simply that of the safety valve. It is, in fact, a valve which, weighted to a given pressure, lifts when that pressure is applied; being connected with the gage, that latter should indicate the same pressure; if it does not, the amount of error is obvious.

The apparatus, which is shown taken apart in Fig. 2, consists of a brass base, provided with a pipe, A, to be connected to a pump. At B is a hardened steel valve and seat, the latter having knife edges for the valve to rest upon, and being made exactly one square inch in area. There is a guide stem on the seat to enter a hole in the valve and so guide the same; and the water pipe, A, it will be noticed by the direction of the dotted lines, has its aperture directly under the valve. The valve, when in place, makes a tight joint with the knife edges, and the pressure beneath is confined until it exactly balances the combined weight of the valve, yoke, C (which rests by a pointed projection upon the valve), and any extra weight which may be suspended from the lower hook of the yoke.

The mode of operation will be better understood from Fig. 1, which represents the weighted yoke in place, and at the same time the test pump and test gage, which may be purchased from the manufacturers below named, with the test valve. D is the pump, in the reservoir of which water is poured; and by turning the screw, pressure is caused beneath the valve and also in the test gage, E, and in the gage under examination, which is applied at F. The pieces of iron, etc., attached to the lower end of the yoke are previously weighed, so that the valve must lift and the water escape by the overflow pipe, G, the moment such known weight is exceeded by the water pressure. The limit, therefore, cannot be overstepped, and hence the gage under examination and at the same time the test gage should each indicate a pressure equal to the weight attached to the yoke, *plus*, as before stated, the weights of yoke and valve.



The device is simple, easily operated, and reliable. It is sold for $18.

Patented to Edwin A. Wood, through the Scientific American Patent Agency, September 22, 1874. For further information, address the manufacturers, the Utica Steam Gage Company, Utica, N Y.

New Steel Works.

The new Edgar Thomson Steel Works at Pittsburgh, Pa., were duly opened on September 4, in the presence of several hundred invited guests. The latest improvements are introduced throughout the establishment. For example, red hot ingots of steel, weighing a tun, are transferred from the truck to the rolls by one man. The great saving in manual labor and the superior excellence of the metal produced will enable this concern to distance all foreign competition. One of the tests of the steel at these works is to fix one end of a railroad rail, and by means of a wheel at the other end twist the rail twice, which is done without fracture of the rail.

REMARKABLE SWIMMING.—A girl of fourteen, named Beckwith, daughter of the champion swimmer of England, recently swam from London Bridge to Greenwich, a distance of over five miles, in one hour and eight minutes. This is believed to be the fastest swimming on record.