Science and Art.

Science of Things Familiar.

Why is rain water soft? Because it is not impregnated with earth and minerals.

Why is it more easy to wash with soft water than with hard? Because soft water unites freely with soap and dissolves it, instead of decomposing it as hard water does.

Why do wood ashes make hard water soft? 1st, Because the carbonic acid of wood ashes combines with the sulphate of lime in the hard water, and converts it into chalk; 2d, wood ashes also convert some of the soluble salts of water into insoluble, and throw them down as a sediment by which the water remains more pure.

Why has rain water such an unpleasant smell when it is collected in a rain tub or tank? Because it is impregnated with decomposed organic matters washed from the roofs, trees, or the casks in which it is collected.

How does blowing hot foods make them cool? It causes the air which has been heated by food to change more rapidly, and give place to fresh cold air.

Why do ladies fan themselves in hot weather? That fresh particles of air may be brought in contact with their face by the action of the fan; and as every fresh particle of air absorbs some heat from the skin, this constant change makes them cool.

Does a fan cool the air? No, it makes the air hotter, by imparting to it the heat from our face; but it cools our face by transferring its heat to the air.

Why is there always a strong draft under the door and through the crevices on each side? Because cold air rushes from the hall to supply the void in the room caused by the escape of warm air up the chimney, &c.

Why is there always a strong draft through the keyhole of a door? Because the air in the room we ocupy is warmer than the air in the hall; therefore the air from the hall rushes through the keyhole into the room, and causes a draft.

Why is there always a draft through the window crevices? Because the external air, being colder than the air of the room we occupy, rushes through the window crevices to supply the deficiency caused by the escape of the warm air up the chimney.

If you open the lower sash of a window there is more draft than if you open the upper sash. Explain the reason of this. If the lower sash be open, the cold external air will rush freely into the room and cause a great draft inward; but if the upper sash be open, the heated air of the room rushes out, and, of course, there will be less draft inward.

Why is a room best ventilated by opening the upper sash? Because the hot vitiated air, which always ascends toward the ceiling, can escape more easily.

By which means is a hot room more quickly cooled—by opening the upper or lower sash? A hot room is cooled more quickly by opening the lower sash, because the outer air can enter more freely into the lower part of the room where it is colder.

Why does the wind dry damp linen? Because dry wind, like a dry sponge, imbibes the particles of vapor from the surface of the linen as fast as they are formed.

Which is the hottest place in a church or chapel? The gallery.

Why is the gallery of all public places hotter than the lower parts of the buildings? Because the heated air of the building ascends, and all the cold air which can enter through the doors and windows keeps to the floor till it has become heated.

Improved Pump.

The prosperity of a nation may in some measure be estimated by the regard which that nation has for water, the almost universal liquid, and to which man owes so many blessings. Do the streams, hurrying from the mountains to be engulfed in the sea, meet water-wheels on their way? then there is prosperity. Do houses on hills have plenty of water from the valleys? then there is civilization. No people think more of contrivances for raising water or using the power of falling water than ourselves, and a good illustration of the fact is, that inventors are always producing something new and improved in these classes of machines. Such a one is the subject of our engraving, being a pump without suction or packing, and it is the invention of John Powers, of this city, to whom a patent was granted April 5, 1859.

"THE AMERICAN PUMP."

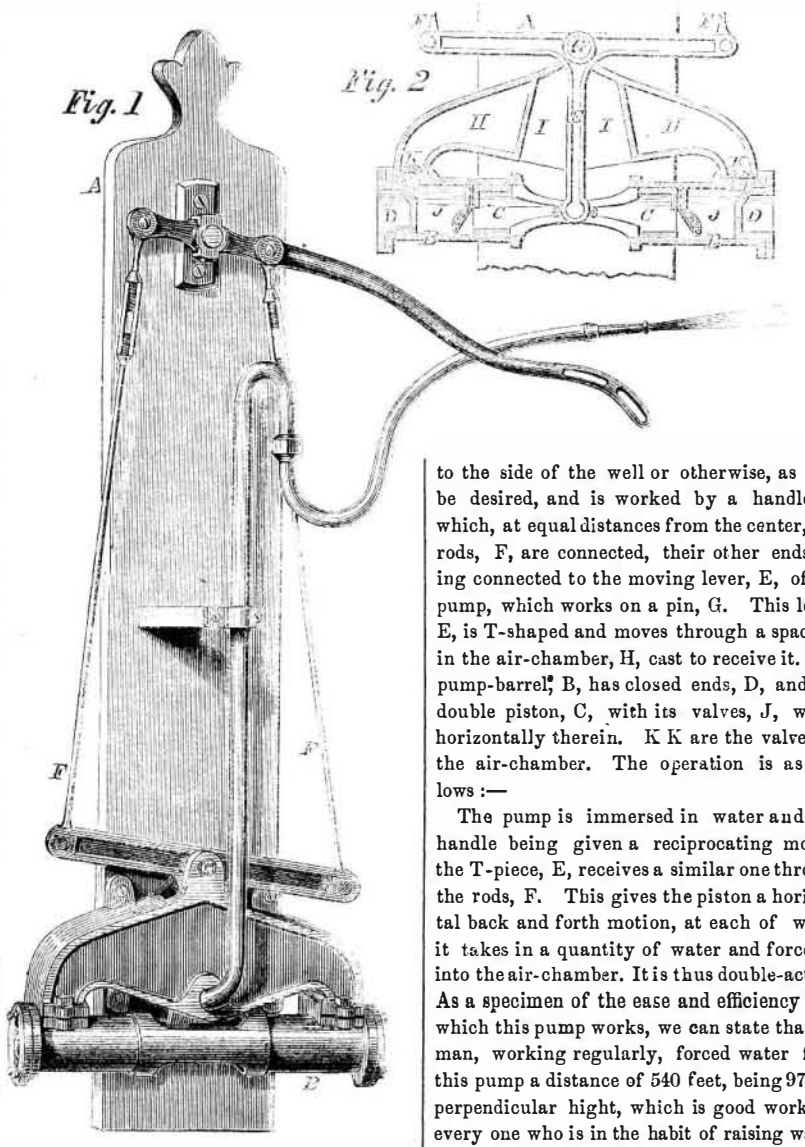


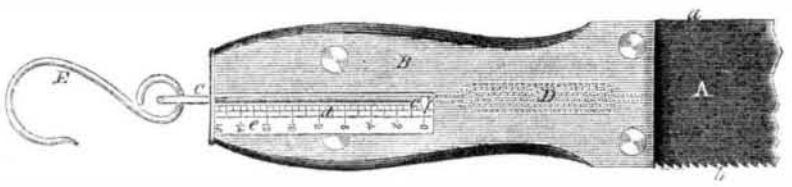
Fig. 1 is a perspective view and Fig. 2 a section of the working parts, which we will now proceed to explain.

The pump is attached to a board, A, secured to the side of the well or otherwise, as may be desired, and is worked by a handle, to which, at equal distances from the center, two rods, F, are connected, their other ends being connected to the moving lever, E, of the pump, which works on a pin, G. This lever, E, is T-shaped and moves through a space, I, in the air-chamber, H, cast to receive it. The pump-barrel, B, has closed ends, D, and the double piston, C, with its valves, J, works horizontally therein. K K are the valves of the air-chamber. The operation is as follows:—

The pump is immersed in water and the handle being given a reciprocating motion the T-piece, E, receives a similar one through the rods, F. This gives the piston a horizontal back and forth motion, at each of which it takes in a quantity of water and forces it into the air-chamber. It is thus double-acting. As a specimen of the ease and efficiency with which this pump works, we can state that one man, working regularly, forced water from this pump a distance of 540 feet, being 97 feet perpendicular hight, which is good work, as every one who is in the habit of raising water, knows.

Any further information can be obtained by addressing J. M. Edney, 147 Chambers street, New York City.

SMITH'S BALANCE, KNIFE AND SAW.



We could not help thinking, while examining the subject of our illustration, what a convenient thing it would have been for that Shylock of "pound-of-flesh" memory. Instead of the actor carrying (as he does now) a pair of scales at his girdle, the like of which were *never* seen in Venice, let him in future have this balance, knife and saw, suspended to his gaberdine, and he will look the amateur butcher that he wishes to be.

This is really a sensible invention and deserves to quickly come into general use; it is simply a knife, A, with an edge, *a*, and saw-back, *b*, or any knife without a saw-back. In the handle, B, a spring, D, is secured and to this a bar, C, is attached and a hook, E; a pointer, *c*, projects through a slot, *d*, in the handle and marks the weight on the graduated scale, *e*. This scale and pointer may be dispensed with, and the pounds and ounces marked on the bar, C, the bottom of the handle serving as an index. The spring balances are cheap and will not materially increase the cost of the knife, so that every family can possess one, for they are not intended for the exclusive use of the butchers and grocers, although they will be glad of such a useful and time saving device.

The inventor is Geo. H. Smith, of Glenwood, Iowa, and it was patented Sept. 15, 1858. Any further information can be obtained by addressing the inventor or Bernard C. Meyer, 347 Broadway, New York City.

The Patent Office.

We learn that the United States Patent Office at this moment exhibits a degree of activity never exceeded since the period of its organization; that the revenues during the past quarter were greater than had ever been realized in an equal space of time; that the facility in the dispatch of business, acquired by enlarged experience and the stimulus of success, has likewise increased; and that there is a daily growing demand upon its services. This intelligence is gratifying when regarded simply as showing the satisfactory progress of an important branch of one of the departments of the government; but when we remember that the history of the Patent Office, reviewed in connection with the financial history of the country, renders it apparent that no branch of enterprise and industry is more sensitive to the influence of depressing causes, we have reason to rejoice in the facts here related, as evincive of the spirit of the people and of their buoyant hopefulness and general prosperity. It is also observable, as we are informed, that the character of the discoveries and improvements for which patents are claimed are generally, both in the ingenuity exhibited and the utility of the purposes designed to be accomplished, of a character calculated to afford an argument in favor of the advancement of the intelligence and scientific appreciation of the country. This, we are assured, is particularly shown in the increased attention given to the subject of chemistry in its application to manufactures, the mechanic arts and agriculture, as well as to the processes of the laboratory itself—a field probably opening a wider and more inviting range for discovery than any other to which the inventive genius of our citizens is applied. —*Washington Constitution, April* 14.

A Good Story.

A correspondent and old subscriber to the Scientific American, who lives in Iowa, sends us the following amusing anecdote:—

"A few weeks since, my little boy was at a neighboring village where he saw a man selling rights for a patented machine. He asked a gentleman what part of the machine was patented;' to which the vender answered 'The whole thing.' 'I guess not,' said the boy, 'for there are many parts which are not new or patentable.' 'How do you know about patents and machines, boy?' said the surprised patent-vender. 'Sir,' replied the boy, 'my father has taken the Scientific American for thirteen years, and I learn by that not to be fooled by itinerant patent peddlers.'"

That was something like a boy! and we hope that many boys will imitate him by reading the Scientific American, and that many fathers will take it for their boys to read.