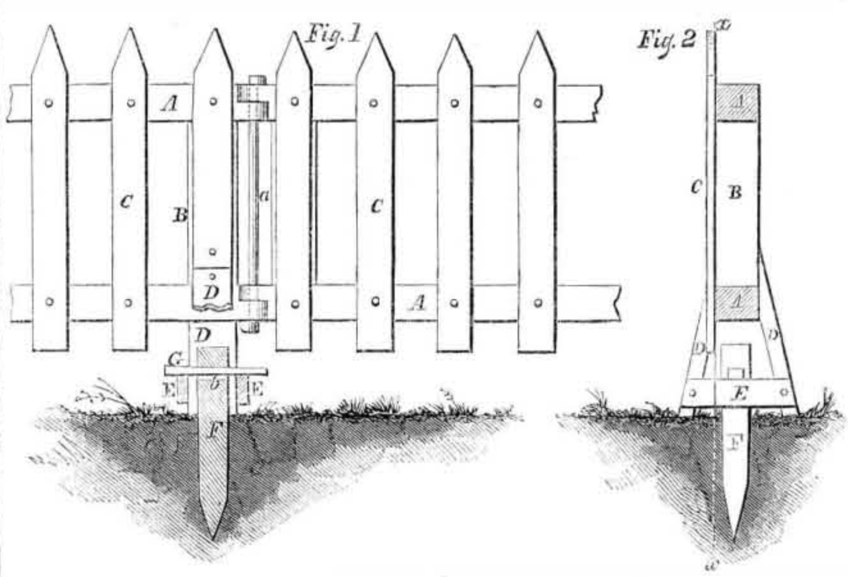
The air which for about forty miles surrounds our earth has a definite weight; and although we can neither see nor feel it, we are conscious of its presence by the momentarily operation of breathing. The weight of a column of air one inch square, and forty miles high, is about fifteen pounds. The reason why we are not crushed down by this enormous weight is, because we are surrounded on all sides by it, and as the pressure or weight is equal all around, it becomes, as far as we are personally concerned, insensible.

That the air *does* exert a definite pressure, in consequence of its weight, may be easily proved by any one with the above simple apparatus—only a tumbler and a sheet of paper. Fill a tumbler quite full of water, and carefully draw over its top a sheet of clean letter paper, and be careful to see that there are no bubbles of air in the water; place your hand over the paper while inverting it, and when the glass is mouth downwards the water will be kept in, until the paper becomes wet through. The air pressing against the mouth of the tumbler is of greater weight than the contained water, and so until some air can get in, to supply the place of the water, it cannot fall out.

This experiment is a demonstration of the heat and light which are evolved during chemical combination. The substance, phosphorus, has a great affinity for oxygen gas, and wherever it can get it from, it will, especially when aided by the application of heat. To perform this experiment, put half a dram of solid phosphorus into a Florence oil-flask, holding the flask slantingly, that the phosphorus may not take fire, and break the glass; pour upon it a gill and a half of water, and place the whole over a teakettle lamp, or any common lamp, filled with spirits of wine; light the wick, which should be about half an inch from the flask; and as soon as the water is boiling hot, streams of fire, resembling sky-rockets, will burst at intervals from the water; some particles will also adhere to the sides of the glass, immediately display brilliant rays, and thus continue until the water begins to simmer, when a beautiful imitation of the aurora borealis will commence, and gradually ascend until this collects into a pointed cone at the mouth of the flask; when this has continued for half a minute, blow out the flame of the lamp, and the apex of fire that was formed at the mouth of the flask will rush down, forming beautiful illumined clouds of fire, rolling over each other for some time; and when these disappear, a splendid hemisphere of stars will present itself. After waiting a minute or two, light the lamp again, and nearly the same phenomena will be displayed as at the beginning. Let a repetition of lighting and blowing out the lamp be made for three or four times, so that the number of stars may be increased; and after the third or fourth act of blowing out the lamp, the internal surface of the flask will be dry. Many of the stars will shoot with great splendor from side to side, whilst others will appear and burst at the mouth of the flask. What liquid remains in the flask will serve for the same experiment three or four times, without adding any water. Care should be taken, after the operation is over, to put the flask in a cool and secure place.

STANARD'S PORTABLE FIELD FENCE.



Portable field fences are in very general use; and from the fact of their portability, being so easily adjusted or taken down, they are in general more valuable to the farmer than the fixed fence, because they enable him to alter the size of any of his fields just as occasion may require, or the amount of his live stock and the state of the produce market may demand. The one we are about to describe is an invention tending to increase their utility, by providing a very firm as well as portable fence.

In our engravings, Fig. 1 represents a side view of a portion of the panels of a fence, the posts being bisected as indicated by the line, *x x*, Fig. 2, which is a transverse vertical section of a panel, showing the improvement. The same letters indicate similar parts in each.

A A represent horizontal and parallel strips, which are nailed to the upper and lower ends of the post, B, the pickets, C, being nailed to these posts as usual. The strips, A, may be of any suitable length, corresponding to the distance between the posts, B. Each length or portion of fence formed by the strips are termed "panels," and these panels may be connected by "halving" the ends of the strips, overlapping the same, and having rods, *a*, pass vertically through them, as shown plainly in Fig. 1. To the lower end of each post, B, there are attached two inclined bars or braces, D D, the lower ends of which are connected by cross ties, E E; the bars or braces and cross ties form the bases or sills of the posts. F represents stakes which are driven in the ground where the fence is to be placed or erected, the distance between each corresponding to the distance between the posts, B. Through the upper end of each stake, a mortise, *b*, is cut, and the stakes are made of such a thickness that they may fit between the cross ties, E, of the braces of the posts, the upper ends of the mortises, *b*, in the stakes extending sufficiently above the cross ties, E, to allow wedges, G, to be driven through them.

The wedges, G, secure the posts, B, firmly to the stakes, and the lower ends of the bars or braces, D D, rest upon the ground or stones prepared for them, and serve to support the posts, preventing any lateral movement or rocking of the same.

This fence may be quickly put up and taken down by persons not possessing much, if any, mechanical skill; it may also be cheaply constructed, and is equally as durable as any ordinary picket fence.

It is the invention of H. T. Stanard, of Wayne, Mich., who will give any information that may be desired. It was patented December 22, 1857.

Bad Shoe Leather.

A correspondent writing to us from Boonville, Ark., complains bitterly and justly of the miserable character of the leather employed in common boots and shoes. He states that public opinion, or special law, should be brought to bear in putting down the use of split leather for feet clothing—it may answer well enough for carriage tops and cushions. He says: "Good leather, if left whole, is tenacious, and nearly waterproof, but when split, its tenacity and water-proof quality are destroyed. If we take a thick piece of woolen cloth, and split it through the middle, how long will it last? It will soon go to shreds. It is the same in degree with leather; the fibres of it are interlaced, and bound firmly together, but by splitting, they are severed, and their mechanical adhesiveness destroyed." He complains severely of the boots and shoes made in the East, and sent to Alabama. He says: "One of every pair of shoes is generally made with a bad forepart and a good hindpart, and the other *vice versa*;" the result is that the one with the bad forepart is much sooner worn out than the other, but both have to be thrown away together. "I need annually," he says, "six pairs of this miserable sort of *store shoes*, costing here about two dollars per pair; and from the very start they cannot keep my feet dry, all because they are made of split, and ill-selected leather. If the leather were not split, it would last twice as long. If I could get better leather (unsplit), I could afford to pay a higher price for it, and it would not cost me any more for shoes per annum, because I would not require so many pairs; at the same time it would be much better for me, because they would keep my feet dry."

Our correspondent, we believe, has good reasons for complaint in regard to the use of split leather in shoes. But who is to blame for this? Shoemakers furnish just such goods as the market purchasers demand; some cheap and poor—others good, and of high price. If storekeepers would not buy poor shoes, of course manufacturers would not make them.

A Prominent Man of Science Gone.

Sir George Cayley, recently (Dec. 15) deceased in England, at the advanced age of 84 years, was a prominent inventor and a man of science. He invented a hot air engine, long before the *Ericsson* was dreamed of, and so enthusiastic was he in the belief that air was superior to steam as a motive agent, that he made experiments in the hope of perfecting his engine up to a period close upon his decease. Many eminent inventors and men of science, like Sir George, oftentimes get upon the wrong track, and go round and round in the same path, like the moon around the earth, and yet think they are going ahead—always advancing—because they keep the same face to the great center of attraction. He was a firm believer in the ultimate success of electricity as a motive agent in machinery, and he invented a very excelleat instrument used in London for examinations of impure waters, such as those of the river Thames.

Coal and Cinder Sifter.

A great quantity of fuel, in the form of half-burnt cinders and small cool, is wasted in every household. To save the greatest part of this, S. Adams, of Boston, Mass., has invented a cinder and coal sifter, consisting of a circular riddle attached to a spindle, which can be rotated by hand, and passes through a cover, by whose means it can be placed on the top of the ash barrel, and the dust sifted into it, while the unburnt cinders and small coal are saved. It was patented Sept. 8, 1857. It is a very useful article.

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