

the electric fluid. In short, all those that were struck dead preserved the last attitude of life.

Cases of lightning stroke are unfortunately quite numerous, but the number of those in which a preservation of the attitude has been observed is relatively limited. Although there are no comparative figures upon which an exact proportion can be established with certainty, it nevertheless appears that they are more frequent after lightning stroke than after other modes of sudden death.

Let us further remark that in cases of death by lightning, with a preservation of the attitude, it has been found that no external lesion exists (obs. 11) upon the body of the victim, and no autopsy has shown what point was thus influenced without any apparent contact. Perhaps no peculiar alteration could have been found in the essential organs of life; and it is especially in such cases that we may employ the expression *sideration* in all its acceptations.

The peculiar circumstances that accompany death by lightning may acquire (as they have done) a certain importance from a medico-legal point of view. But I have not to concern myself with that here, my only object having been to point out a few interesting facts, whence we may draw some useful data for the study and solution of this question of post mortem preservation of the last attitude of life.—*Dr. J. Rouyer, in La Nature.*

Manufacture of Soda.

The Leblanc process of manufacturing soda is carried on at the works of the Newcastle Chemical Company, which have been in operation 50 years, and are so extensive as to cover more than 60 acres of ground. Some idea of the magnitude of the operations of this company is conveyed by the fact that they manufacture upward of 60,000 tons of products per annum, comprising soda ash, soda crystals, refined soda, and bleaching powder. A large number of auxiliary processes are included, such as repairing shops, fire brick works, gas works, and a very extensive cooperage, capable of turning out 1,000 casks per day. Several of Wilson's gas producers have been erected at these works, and yield satisfactory results. The following is an outline of the processes carried on: Sulphuric acid is produced from pyrites smalls (which contain about 50 per cent of sulphur) in the usual lead chambers. The sulphuric acid is used for decomposing common salt; thus producing hydrochloric acid and sulphate of soda. The latter is mixed with a proportion of limestone and small coal, and fluxed into a uniform mass in large revolving cylinders; thus producing "black ash." The liquor obtained by lixiviation of this black ash with water is a solution of carbonate of soda, which is obtained in the dry form by evaporation. This is further refined by resolution, and allowing all soluble impurities to settle out; and the refined liquor when evaporated yields ordinary washing soda. The hydrochloric acid is collected by passing the gas into towers supplied with water, similar to gas works scrubbers, and packed with brickbats. It is used for the manufacture of chloride of lime (bleaching powder).

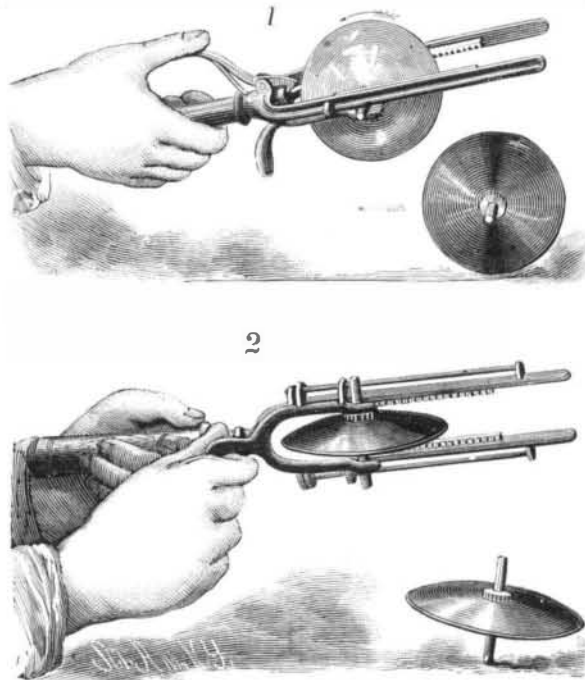
CHEMICAL OBSTRUCTIONS IN IRON WATER PIPES.

We take the following illustration and notes from a paper read by Col. Wm. Ludlow before the Engineers' Club of Philadelphia. The illustration is of a specimen of water pipe which had been taken up for the improvement of the water supply to certain dwellings in Philadelphia. It is of two inch pipe, about twelve inches long, and had been in the ground twelve to fourteen years, connecting the main in the street with the house fixtures. Upon testing the water pressures with a gauge, it was found that the hydrant in front of the house had a pressure of seventeen pounds, which was reduced in the kitchen of the house to seven pounds, the difference clearly indicating an obstruction in the service pipe. The pipe having been taken up, a piece was sawed longitudinally, when the interior was found to be nearly filled with a deposit composed of the sesquioxide of iron and sedimentary matters, the tortuous channel through the pipe being constricted at several points to about three-eighths of an inch. Another piece of obstructed pipe, originally three inches, which had been in the ground over thirty years, had become almost entirely closed from the same cause.

Discoveries of this kind are constantly being made, and pipe that has been in the ground over ten or twelve years cannot be depended upon to convey its full volume. Two methods of obviating this difficulty other than galvanizing, which was not considered advisable for a supply of water for drinking purposes, were known. The one in use by the department (Philadelphia) for its large mains, namely, coating the pipe when newly made with a coal tar pitch prepared and supplied in accordance with certain specifications, apparently protected the pipe for a period of from twenty-five to thirty years. This, however, would be less advantageous in the case of small service pipes, for the reason that it decreased in a considerable proportion the available diameter. The other method was a process known as the 'Bower Barff,' which consisted in coating the pipe with a film of magnetic oxide produced by subjecting the iron to the action of superheated steam or air under certain conditions. This process promised good results."

A NOVEL TOY.

The construction and manner of using this interesting toy are very clearly shown in the accompanying engraving. In the handle of the toy, shown in the upper view, is a spring which is compressed by a rod upon whose outer end is a carrier moving in parallel guide bars whose inner sides are formed with racks, in which engages a pinion on the spindle of the top. The carrier is held in place by a spring catch. In the second view the spring is done away with, the carrier being moved by hand. When the carrier is released—the instrument being held with the trigger toward the right hand—the top will be thrown from ten to twenty feet away and will spin upon its spindle; when held with the trigger toward the left hand, the top will describe a curve in a con-



VOLKE'S NOVEL TOY.

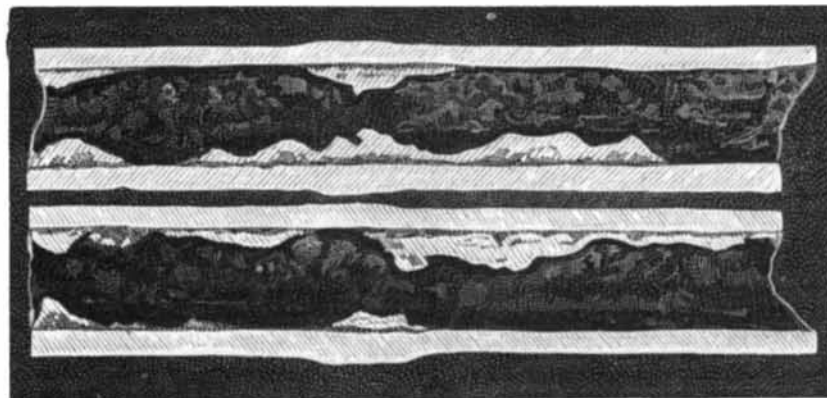
trary direction. When the trigger is held upward, as shown in Fig. 1, the top will run away to a distance of about twenty feet, stand still an instant, and then return; but when the position of the toy is reversed, the top will roll away from three to four hundred feet, according to the ground.

This invention has been patented by Mr. C. A. Volke, of 53 Canal Street, Stapleton, Staten Island, N. Y., who may be addressed for further particulars.

Small Inventions.

We have had it in mind for a very long time, says the *American Inventor*, to obtain some solution to the question: What are "small inventions"? This and the kindred phrase, "mere mechanical skill," are matters that puzzle us. They constitute the great and annoying unguessed riddles of the present day. We know that the law has not intimated, so much as by expression or impression, that there is to be any scale in estimating the degree of novelty in any given device or process. It seems to be the intent of the law that any improvement, so long as it is a tangible one and expressible in words and by claim or claims, is to have favorable consideration.

But later students in this time of reason and judgment have, as we are informed, come to the sagacious conclusion that too many patents on small inventions are granted, and



CHEMICAL OBSTRUCTIONS IN IRON WATER PIPES.

so the ruling of the Patent Office has been tending somewhat of late, as it appears to us, to establish a policy of exclusion based on the merely chimerical hypotheses suggested above.

We do not say that there never has arisen, or never will arise, an instance where an invention is so merely seeming and not substantial as to lack the real merit of an advance, or that sometimes a so-called invention may not be simply the result of a workman's skill. We grant that very unfrequently such an instance may arise, possibly once where the assertion of the one or the other change is made a hundred times.

But we do allege that the law supposes, takes it for granted, admits, assumes, that an improvement is an advance, and so says it shall be patented. Who so good a judge of the real worth and value of one of this kind of inventions as

the man who at the work bench, in the factory, on the farm, or in some other hard, prosaic, and rough school, having solved the problem and made the improvement, pays the costs and charges of obtaining the patent, and is willing to bear all the risk of making anything out of the patent? The mere possession of his letters patent confers no power on the patentee to work havoc on an innocent public. The courts are open to all to show that the improvement is not good, and equally open to the patentee to prove his case. No small boon this last.

At the recent Cincinnati Convention one of the inventors in attendance told us a tale which disproves scores of the fine spun decisions of the Patent Office on the grounds named above. This party a few years ago was as poor as poverty, had a large family, was blind in one eye, had no friends to help him, and was about to call his game of life a dead loss to all interested. One day, while fixing up, as best he could, the miserable apology for a rail fence that inclosed the few thin and worn mortgaged acres about his home, he hit on a plan of saving one rail in each panel. It was a revelation to him, so he jobbed out around the country, mending his neighbors' fences on this saving plan. After a while and by exertions, the narrative of which would moisten any hearer's eye, he scraped enough money together to enable him to apply for a patent. As a matter of course, in those days his case was rejected over and over by the examiner. Finally he appealed, and by good luck got the ghost of a claim. In a few months, by sales of patent rights, he had paid the large costs and interests on the money borrowed to get the patent, and cleared some three thousand dollars besides. This patent was simply a starter, for he invented many improvements in fencing, farmgates, etc., till now he has more than a dozen patents. He is said to be worth upward of \$30,000 to-day, and to be held in great esteem by his neighbors as a driving, steady, honest business man.

We do not intend to convey the impression that every so-called small invention can be made a like bonanza. We do insist that under the law every improvement is patentable, and no man or men in the Patent Office have the right to say how much this improvement shall be before the patent can be granted.

Progress of the Russian Petroleum Industry.

It is claimed by an English writer that although the photometer indicates that the ordinary American oil is capable of yielding in the best lamp a greater amount of light, irrespective of the quantity of oil burned (especially when the lamp has been recently filled and trimmed) than the Russian oil affords in the same lamp, yet the latter gives what the consumer would call a good light, not only at first, but after several hours' burning, and actually furnishes more light per gallon of oil burned than is afforded in the combustion, under similar circumstances, of three out of five samples of ordinary American oil examined, and but little less light is yielded by an equal quantity of the American water-white oil tested.

The experiments made at the instance of the German Government have proved a like result, and European testimony is very clear on the question of quality. The crude naphtha does not give so large a quantity of burning oil as the American naphtha—only 25 to 30 per cent—but the low cost of the crude naphtha is so trifling, and the value of the 70 per cent of residue for the manufacture of other oils is so great, that the compensation is quite sufficient for the lesser quality of kerosene.

The conclusions arrived at are easily summed up thus: Russian kerosene (petroleum burning oil) will, without doubt, before long drive out the American oil from all parts of Eastern Germany—it has already done so from the towns near the Russian frontier. Gradually the same result will arrive throughout Austria and all the countries bordering on the Danube. Later, but also surely, American oil will be driven from central Germany, and from the countries near the Mediterranean Sea, while the lubricating oils and other products have already taken a firm stand in all the capitals of Europe—London included. One of the men who has done much to introduce naphtha products into Europe, M. Ragsine, is even sanguine enough to declare that he will sell machinery oils of Russian manufacture in America, and many of our burning oil makers are looking to London and Bremen as the future markets for large quantities of their products. They will not be contented with supplying Turkey, the East, China, Japan, etc., but want the larger and nearer markets of Europe. They

couple with this the use of masouta, or liquid fuel, as something which will give Russia a large export trade and enrich the country by thus disposing of the large supplies nature has given her.

Permeability of Silver for Oxygen Gas.

BY L. TROOST.

THE author proves that pure oxygen and the oxygen of atmospheric air are capable of passing through the sides of a heated tube of silver, while a mere trace of nitrogen penetrated the metal. Carbonic monoxide and dioxide also permeate silver, though more slowly than does oxygen. The author suggests that pure oxygen may be obtained from the air on this principle. The temperature of the metal must not exceed 800°.