land, but in most seasons this could hardly occur. If, in placing the public lands in market, alternate sections, of sufficient width, were first sold, the intervening ones being reserved, the tendency would be to ultimately break up the forest regions in just the way indicated.

As to those reckless persons who, careless of results, fire burning wads, throw stumps of cigars or knock the fire out of their tobacco pipes, into dry leaves, regardless of the extent of damage to which their carelessness may lead, it is probably difficult to reach them by law, but something might be done toward awakening in them a sense of moral responsibility by properly circulated printed warnings, and appeals to their humanity. Such a course would tend to render the thoughtless thoughtful, and would lessen risks.

It is to be hoped that the attention of Congress will be called to the importance of this subject at its next session; and that at least some experimental attempts will be made to lessen the enormous waste which now goes on entirely unchecked by any effort to prevent it.

GENERAL REFLECTIONS SUGGESTED BY THE FAIR OF THE AMERICAN INSTITUTE.

It would be strange if such a display of mechanical, chemical, and general industrial improvement, as is now on exhibition at the Fair of the American Institute, should fail to suggest many valuable hints to the thoughtful mind.

There are thousands who go to such places merely for amusement, and for such there is generally plenty of food for mirth in the eccentricities of exhibitors and spectators, and the amusing incidents that are sure to take place in any large gathering of people.

There are others whose minds are ever on the alert to gather some crumbs of instruction from every thing with which they come in contact. Such will see, in many things displayed this year, that mechanical invention, asserted by some pessimists to be on the decline, is really in the full pride of its strength; that it still retains its eager scent for novelties, and that, the combinations of crude elements into new forms of beauty and usefulness being infinite, there can be no such thing as an end to invention.

One of the most striking of the features of this year's display, is the advance made in cutting and working hard materials. The diamond rock drilling and stone sawing, and, the greatest triumph of all, the process of cutting stone, glass, and even more refractory materials, by the simple agency of a sand blast, have placed resources, at the command of the engineer, the architect, and the decorator, that open an entirely new field of industry, into which an army of workers will be shortly introduced.

No one can pass through this collection without observing numerous new applications of electricity in the arts. If this force fails to give us a motor, of sufficient power and economy to propel machinery, it furnishes one of the very best means of controlling other forces, almost imparting intelligence and feeling to the performance of automatic machinery, and acting with a delicacy approaching the sense of touch. It is evident that the uses of electricity are destined to become far more widely extended than at present, and it may be that even that grandest of human achievements, the electric telegraph, may find its peer in other applications of this subtile yet docile force, that, like light and heat, pervades the universe.

The various displays of ornamental art show, strikingly, the increase of desire for luxurious living, and the endless craving of the human heart for something more and better than it already possesses. This craving has kept the demand, for everything that human ingenuity can produce, fully up to the supply, and will so continue it, no matter how many and various may be the productions which loom, forge, the sculptor's chisel and the painter's brush, throw upon the market. "The eye is never satisfied with seeing," said Solomon, and so long as inventors produce novelties, just so long will they find them absorbed into the multitude of things which taste and the means to gratify it collect in modern homes.

In the steam engineering display are to be found ample evidences of two important tendencies of the time, namely, to the increased use of sectional and safety boilers, and the employment of all attainable safeguards against neglect of boiler tenders. People have been, by numerous destructive accidents, thoroughly aroused to the importance of caution in the use of steam, and desire to enforce careful attendance by the use of tell-tale appliances, that bring carelessness into light; and the general feeling, among those who use light steam power, seems to be that safety is preferable to economy, if both cannot be secured together. For light powers, also, simple forms of engines, having few parts and complications, are preferred to those of more complicated forms, even though the latter may give more economical results.

In household and domestic appliances and utensils, there is a constant accession of new inventions; and judging from the favor many of these simple yet useful things seem to obtain, there must be always purchasers for any meritorious novelty in this line. There is a great variety of these articles at the present fair, and the interest taken in them shows that, after all, the homely things of practical utility are even more attractive to the average mind than works of art.

Of the latter, there are enough exhibited to show that, in the arts of design, the country is making rapid strides, and may hope to rival older countries in this field, as it has surpassed them in others.

Not to extend these rambling thoughts to a tedious length, we will conclude by remarking that the educational influence and power of such exhibitions, upon the public mind, can scarcely be overrated. In them are combined, in the most attractive manner, both instruction and amusement, without any objectionable features. For these reasons, they should be well encouraged. Every parent who desires to instil healthy tastes and principles into the minds of youth has an interest in their support.

USE OF SODIUM FOR BLASTING.

The employment of sodium for blasting rocks has been frequently proposed, and numerous experiments have been tried. The subject is again revived, and we have some of the figures upon which its use is founded. To decompose 9 parts, by weight, of water, 23 parts, by weight, of sodium, are required; and the product is 31 parts of soda and 1 part of hydrogen. If we employ 46 grammes of sodium, this will evolve, with 18 grammes of water, 2 grammes of hydrogen, which occupies a space equal to 22,471·9 cubic centimeters. If the sodium be sealed up in a glass ball of the capacity of 50 cubic centimeters (46 grammes sodium occupy 44·7 cubic centimeters), the hydrogen gas will exert an explosive force against the walls equal to 450 atmospheres. In the practical application, it is proposed to take two glass bulbs connected by a thin tube. In the upper bulb is placed the metallic sodium; in the neck between is formed a soluble salt, and in the lower bulb is drawn some water, when required for use. By filling the lower bulb with water, and inverting it, the salt will gradually dissolve and give the water access to the sodium, and the explosion follows.

The bulbs can be safely transported, as the water is put in like a charge of powder, and the length of time required for the melting away of the intervening salt can be calculated.

For submarine blasting, for employment in crevices, for hollow trees, and other purposes in which gunpowder is not easily available, a fuse of metallic sodium can be highly recommended.

PROPULSION OF STREET CARS.

The writer well recollects how, in his youth, together with other mischievous boys, he used to hang an old red flannel shirt on the fence of a pasture in which was inclosed a bull. Then hiding in an adjacent thicket, it was considered glorious fun to watch the irritated animal, as he would paw, and bellow, and finally charge at the shirt, usually going through the fence; when, before he could recover himself, the shirt was withdrawn from his sight, through the agency of a piece of strong twine, and the enraged animal would recover his temper in his supreme astonishment at his supposed complete destruction of the irritating object.

The public, like this bull, often rushes pell mell at any proposed innovation, without stopping to consider whether there is any good ground for its opposition. It is always ready with objections against anything new, whether it has reason on its side or not.

Inventors have been busy working out ways and means to propel street cars without the aid of horses. Few of them have stopped to consider, that, when they have solved their problem, they will have another to solve, namely, how to allay the foolish fear that such cars, running by steam or other power than that furnished by animals, will frighten horses.

When carriages were first introduced, they were strenuously objected to, and it was even attempted to suppress them by law. When Stephenson was endeavoring to convince the public of the practicability of steam railways, a member of parliament objected that cows would get in the way of the locomotives and be killed; yet we have now plenty of carriages and locomotives, and the world appears to have benefitted by them.

An inventor, who has been a long time experimenting on the practicability of propelling street cars by steam, remarked to us the other day that, were he to put up a brass Yankee clock on the front of one of these vehicles, and demonstrate that he could thus draw cars at the proper speed, the public would object to their use.

Now, not one man in a hundred, in any large city, owns a horse, and not one horse in a hundred is of such bad disposition that he could not readily be broken to tolerate, in the most dispassionate manner, the passage of a street car that ran without horses. So that this objection, sifted down, amounts to the assumption of the privileges of one person in ten thousand as paramount to the interests of all the rest.

There are no doubt many ways in which the application of steam could be made to street cars, which would meet the objections to smoke and ashes discharged in the street, and the puffing of the exhaust. In fact, we know of more than one invention in which these drawbacks have been obviated. Such objections can not lie against the ammonia engine of Dr. Lamm, illustrated and described in our last issue.

There are, however, some requirements in engines for this purpose that many inventors have overlooked. One of these is the ability to mount grades without carrying a surplus of steam on levels. To do the latter, is to waste fuel; and to raise steam quick enough, on the approach to short grades, if not impossible, is, to say the least, not the most scientific and mechanical way of accomplishing the desired object.

The better way is to use the minimum power, required for ordinary grades, for surmounting heavy grades, the latter being ascended slowly enough to permit this.

There are several ways in which this has already been done; the more important of which are, the use of gearing to slow down the motion of the car, while the engine makes the same number of strokes per minute; and the use of a compound engine, the large cylinder of which is worked at high pressure while ascending grades. Either of these plans accomplishes the end sought, but neither seem to provide for that nice adaptation of power to the character of the work to be performed, in a way to satisfy the ideal of nicety in the operation of an engine, as attained by the link motion on locomotives.

There is a wide field for invention in providing the means for drawing cars on city and suburban trainways, and, if we mistake not, the time is nearly ripe for their introduction. We know of several important companies that are anxious to get rid of their bondage to horse-flesh, and some of them are even now experimenting to find the invention that will emancipate them from an expensive and unsatisfactory system.

IMPROVEMENT IN PAVEMENTS----ARTIFICIAL STONE FLAGGING FOR SIDEWALKS.

Our readers will recollect an article on artificial stone, published on page 336, Vol. XXII of the SCIENTIFIC AMERICAN, in which special reference was made to an artificial stone, manufactured by Mr. Herman A. Gunther, now of the firm of H. A. Gunther & Co., 460 Broome St., New York. The basis of this stone is Portland cement and sand, which is treated in a peculiar manner by a chemical solution which greatly increases its hardness and durability. Coloring matters are added by which very exact imitations of the blue and brown stones, so popular for building purposes in this country, are produced in a very rapid and cheap manner.

Mr. Gunther has recently patented, through the Scientific American Patent Agency, an improvement in the use of this kind of stone for flagging side walks, by which stones may be manufactured *in situ*, in squares or diamonds, and still be capable of being taken up without injury, and relaid whenever desired.

The blocks being formed by the aid of suitable molding strips, which separate the stones by about three sixteenths of an inch, the interstices are filled with a peculiar elastic waterproof composition which allows the artificial flags to contract from cold or expand with heat, obviating all danger of cracking from this cause, and, at the same time, preventing the percolation of water to the substratum, thereby preventing subsequent upheaval by frost.

A large piece of sidewalk has been thus flagged, at the corner of Lexington Avenue and Fifty-seventh street, in this city, which we recently visited and examined, and we must say that it would be difficult to conceive a handsomer piece of work, of its kind.

The flags are an artificial blue stone, of great density and hardness, presenting a perfectly level surface, very much superior to the undressed natural flag-stones in common use, while they can be laid at about one fourth the cost. The flags are four inches thick, and we see no reason why they should not prove as durable as the natural stone, since we are aware of experiments extending through three years, with stone of this kind, which have tested its power to resist, to the utmost, atmospheric influences, and which it has endured perfectly.

We regard the improvement as one of much importance, as the difference in first cost will allow the artificial stone to be relaid several times, at less expense than the first cost of the natural stones.

THE HEALTH OF BARON LIEBIG.

From a private letter received in this city, we learn that Professor Liebig is by no means restored to his former state of physical and mental activity. He spent the early part of the summer at the baths of Kissingen, and was much benefitted by the treatment; later in the season, he went to meet a few choice friends, among them his life long colleague, Professor Woehler, at Reichenhall, where one of his sons is a physician; and here, in the invigorating mountain air, his bodily infirmities disappeared; but he complains of dizziness and suffering whenever he attempts the least mental exertion. We fear that the illustrious chemist will hardly be able to enrich our literature with many more of the brilliant writings which have rendered the science, to which he has devoted his best years of his life, so useful and so popular.

Liebig may be justly called the founder of modern chemistry. It was he who first organized laboratory instruction, and rendered it possible for pupils to pursue an experimental science in an experimental way. This has been his chief service, but another almost equally important contribution to the cause of learning has been the popularization of science accomplished by his writings.

Howe's Tobacco Dressing Machine.

This is a machine invented by Mr. James H. Howe, of Utica, N. Y., for loosening and separating the strings of fine cut tobacco, which adhere together, after being cut, on account of the packing of the leaves previous to cutting, and of the adhesive substance used for sweetening the tobacco.

The invention consists in a hopper with a flexible bottom, in which the cut tobacco is placed, two or more pairs of rotary beaters acting against the flexible bottoms by revolving under it, in a manner to thoroughly separate and loosen the strings from each other, and to work the adhering bunches into soft fleecy masses.

The tobacco, when cut from the thick mass of leaves packed together, adheres in thin ribbons or shavings made up of strings, connected side by side, and is commonly separated and loosened by a rapidly up and down shaking machine, which is expensive to keep in repair owing to the great wear and tear occasioned by the rapid movements necessary, and the sudden stopping and starting. Such machines are also objectionable on account of the great amount of power required to operate them.

In Mr. Howe's machine these objections are avoided. The motion being slow and the moving parts operating continually in one direction, require but little power, and the wear will be slight, while the work is claimed to be accomplished in the most satisfactory manner.