

cylinder is used as a covering to the first, leaving a certain distance between the two, so as to allow a constant run of fresh water.

These powers are now extensively used in Paris. A single horse power will give twelve hours work at \$1 50. The advantage is in the facility afforded to use the city gas, without the annoyance and expense of a particular man to drive it. By turning the gas the machine is at once ready to work, and it can be stopped with the same facility. There is no danger from either fire or explosion. One of these machines, $\frac{1}{2}$ horse power, has been imported as a model by Mr. E. H. Parent, civil engineer, Quebec, who will receive and answer all communications on the subject, with all dispatch, and due attention.

Uniform Weights and Measures.

Under the auspices of the International Association for obtaining a Uniform Decimal System of Measures, Weights, and Coins, a collection of the weights of the various countries of the world has been made, and these will form part of the curiosities of the International Exhibition. Few persons are aware of the extraordinary diversities in weights and measures which exist in our own country. The price of corn, for instance, will be quoted in at least fifteen different ways, in as many different localities; at so much per cwt., per barrel, per quarter, per bushel, per load, per weight, per hole, per bag, per coomb, per hobbet, per winch, per wandle, per measure, per strike, per stone. The word bushel is in some places used for a measure, in others for a weight, and this weight is by no means the same in all places. In different towns of England the bushel means 168 lbs., $73\frac{1}{2}$ lbs., 62 lbs., 80 lbs., 75 lbs., 72 lbs., 70 lbs., 65 lbs., 64 lbs., 63 lbs., 5 quarters, 144 quarts, 488 lbs.; and in Manchester, while a bushel of wheat is 60 lbs., a bushel of American wheat is 70 lbs. The measuring of a stone is almost equally various. An acre of land expresses seven different quantities. These variations are highly inconvenient and prejudicial to the transactions of trade; and the labours of the above-named association are directed to the bringing about a uniformity, of which there is great need. The metrical system employed in France is that which is advocated. This has been already established in Belgium, Holland, Sardinia, Lombardy, Greece, Spain, Portugal, and many other parts of the world. Great Britain and the American States, however, still adhere to their old systems.

It may be trusted that our legislation will, ere long, look this matter boldly in the face, and at a single stroke abolish the inconveniences, absurdities, and annoyances contingent upon the anomalous state of things which at present obtains. The decimalization of weights, measures, and money, is a thing which would immortalize the names of any government accomplishing it, and confer on the British public a boon which they would know how to appreciate.—*Mechanics' Magazine*.

The Prevention of Boiler Explosions.

A correspondent writes to the *Manchester Guardian*:—"The dreadful calamity near Bilston, entailing the violent death of twenty-eight persons, has induced me to trouble you with a few observa-

tions on boiler explosions. These so-called accidents arise in the great majority of cases simply from the circumstance that, from original faulty construction or subsequent wear, the material is unable to withstand the requisite pressure. Since the lamentable catastrophe at Mr. Sharp's works, I have uniformly maintained that explosions are always the result of culpable ignorance or negligence—ignorance of the use and necessity of a proper hydraulic test, or neglect of it if known. I am aware that some have pretended that the hydraulic test is injurious to the boiler, and hastens the subsequent explosion. There is no foundation for this opinion. On the contrary, it is certain that if a material, say an iron-wire, has supported a weight for a short time, it may be relied on to support a weight a trifle lighter for a long time afterwards. Besides, I would ask why a test should be refused in the case of steam boilers, when it is applied, as a matter of course, to rifles, cannon, chain-cables, &c. I long ago pointed out, in your columns and elsewhere, a method of testing boilers by hydraulic pressure, in which the conditions of strain under actual work were approximately fulfilled. This method involves scarcely any trouble, and no expense, consisting simply in the use of the expansion of water by heat. Had a pressure one-third greater than the working pressure been so applied from time to time to the Bilston boiler, its weakness would have been long ago exposed, and the loss of life would have been prevented. In suggesting the above test, I was not influenced by merely theoretical considerations. I had repeatedly tested the boiler of a small steam engine employed for scientific researches at Whalley Range. I would ere now have been in the possession of ample details on this subject, so important to humanity, had I not at my present residence met with an unexpected and certainly most uncalculated opposition to my experiments. However, though unable to show the application of the test to my own boiler, I shall have great pleasure in assisting anyone who may wish to make use of it."

Improved Lucifer Matches.

We have recently had occasion to notice some of the many patented improvements which have of late been introduced into the manufacture of lucifer matches. One of the most novel and important inventions under this head is the "patent special safety match" of Messrs. Bryant and May, of Fairfield Works, Bow. The protection afforded by the use of this match is based upon the circumstance that it will only ignite by being rubbed upon the prepared surface of the box; no ordinary kind of friction being capable of inflaming the combustible materials with which the wooden splints are tipped. The match does not itself contain any phosphorus, but is coated merely with oxydising substances, such as chlorate of potash in conjunction with binocide of lead or manganese, and the ingredients are in this manner so divided that it is necessary to employ the special friction surface, prepared with amorphous phosphorus, in order to secure the inflammation of the match. The security against accidental conflagration is thereby reduced to a minimum; the splints have, indeed, so little of the dangerous character of the ordinary match that the makers announce that their manu-