

A BICYCLE FRAME REINFORCE.

The illustration represents a means of strengthening bicycle frames, designed to enable them to withstand more severe strains on the parts where the severest stresses come, while the total weight may be lessened. The improvement has been patented by Ferdinand F. Ide, and is being introduced by the F. F. Ide Manufacturing Company, Peoria, Ill. It consists of a novel form of reinforcing sleeves to be fitted snugly on the parts of the frame tubes where the greatest strains come. Each sleeve has on opposite sides elongated



IDE'S BICYCLE FRAME CONSTRUCTION.

tongues, which taper gradually and become thinner toward the points. The tongues and sleeves are brazed to the frame tubes, and are designed to take up the strains transversely or widthwise, thus providing the requisite strength at the desired points. The tubes of which the bicycle frame is constructed, which have heretofore been of uniform thickness throughout, may be made much lighter when this reinforce is applied at the points where the greatest strains come.

Notes on Acetylene.

The following notes on acetylene are extracted from recent technical journals :

Acetylene gas is being experimented with in Paris as a means of lighting omnibuses, says the Progressive Age. The gas generator, weighing about 26 pounds, is placed upon the back platform, under the stairway leading to the top seats. This generator will produce about one cubic meter of gas from one charging ; but, as recent photometric measurements make the acetylene gas give about fifteen times more light than ordinary gas, this amount provides sufficient light for one trip. The gas is produced from water and calcium carbide, the generator being so arranged as to furnish the gas in a manner exactly proportioned to the consumption under a pressure of only 5.2 inches of water. The light is sufficiently bright to admit the reading of newspapers, and there is no odor. The new light has been too recently introduced to permit any close estimates as to its actual economy, but the cost is said to be less than that of light from petroleum lamps. The electric accumulators previously tried weighed 275 pounds, and the sulphuric acid solution employed was easily spilled and gave trouble.

Some experiments recently completed by Messrs. Berthelot and Vieille, says the American Gaslight Journal, show that considerable precautions are necessary in dealing with acetylene, particularly in the compressed state. The gas in question is an endothermic body—that is to say, a quantity of heat is liberated on decomposing it into its constituents, hydrogen and carbon. Reasoning on this basis, the experimenters determined to try whether the gas could not be detonated by means of a cap of fulminate of mercury. This proved possible, though at atmospheric pressures the explosive wave did not proceed throughout the body of the gas, the decomposition being limited to the immediate neighborhood of the detonation. When, however, the gas was compressed, the experiments showed that it might prove a dangerous explosive. In fact, it was not then necessary to use a detonator,

as it was found that the mere heating of the gas by an incandescent platinum wire was sufficient to cause an explosive decomposition of the acetylene. Average figures from a number of experiments made with different degrees of initial compression showed the following rises of pressure :

Initial Pressure Lb. per sq. in.	Maximum Pressure Observed on Explosion. Lb. per sq. in.	Ratio.
31.7	138.7	4.4
49.4	271.0	5.5
85.1	600.0	7.0
160.0	1,312.0	8.2
301.0	3,028.0	10.1

On opening the steel test tube after an experiment, it was found to be filled with a mass of finely divided carbon agglomerated together by the increase of pressure. The rise of temperature at the moment of explosion was considerable, and in the case of the last of the experiments, referred to above, amounted to as much as 2,750° C. It was, moreover, found possible to detonate liquefied acetylene in the same way, a pressure of over 35 tons per square inch being then attained. The explosion was started, as in the previous cases, by means of a white-hot platinum wire. Dropping a bottle of the liquefied gas, or allowing a heavy object to fall on it, proved insufficient to detonate the mixture, although when the bottle was broken by the weight a violent explosion occurred. This, however, arose from the combustion of the gas, and thus differed materially in nature from the experiments previously made, in which the acetylene was merely resolved into its elements.

Devices of Prisoners for Communication With Each Other.

Some of the ingenious tricks resorted to by the inmates of jails and reformatories to hold communication, contrary to the rules, with their fellow prisoners are thus described in an article on prison life in The Hospital (November 14):

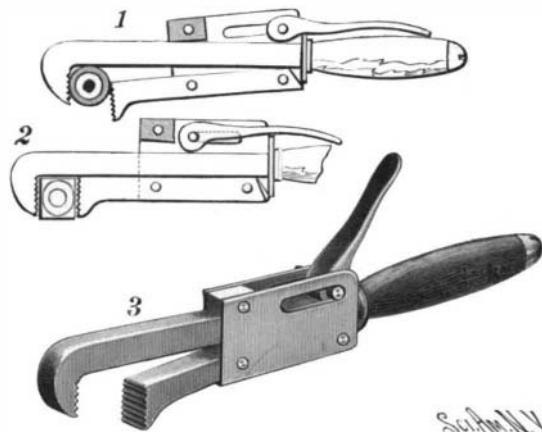
"The prisoners . . . make every conceivable effort to hold intercourse of some kind with their fellow culprits, if only to relieve the silence and solitude—intolerable to persons of their class, who have not sufficient cultivation of mind to supply them with food for thought. . . . Knocking on the walls of separation between the cells, scratching sentences on the sides of the baths or the bottom of the tins used to contain their gruel, and many other devices of that inadequate nature, are instantly detected and stopped by the officials. The chapel is perhaps the most favorable ground for enabling them to let their presence at least be known to acquaintances who have been incarcerated at an earlier or later period from themselves. The male and female prisoners are, of course, rigidly separated during the services. A high and strong wooden partition divides the portion of the building they respectively occupy, but they do not allow this serious obstacle to deter them altogether from the communications they specially desire to hold with the opposite sex. In singing the hymns they often try to introduce words of their own, or make very peculiar responses, which can be understood over the wall. A male prisoner will be afflicted with an extremely bad cough, which, in measured attacks, makes known to a lady friend on the other side that he is 'in quod ;' but he is seldom oppressed by this bronchial malady on more than one occasion, since the governor informs him that, as his cough is so distressing, he is to remain in his cell and not be exposed to the air of the chapel until he is better—a cure for his complaint which is at once perfectly complete. On the female side of the partition a woman permitted to take her infant, born in prison, to chapel with her, pinches the unfortunate mite till its shrill yells reveal her proximity to its father attentively listening through the wall.

"Recently the governor of one of our county prisons was greatly perplexed by the discovery that the female criminals in his charge managed in some mysterious

manner to ascertain the presence of every individual man on the other side of the impervious dividing barrier. One of the women inadvertently let drop the fact that she had recognized her husband, whose position there must, according to rule, have been completely unknown to her. None of the officers could account for an unpermitted knowledge which was found to be shared by all the other women. At last a very careful examination of the chapel gave an explanation of the mystery. Although strictly divided, as we have said, both the male and female prisoners faced the altar in their seats, and over it had been fixed a very large brass cross against the wall, so highly polished as to form a very good mirror. In its clear surface the women saw the reflection of every man as he passed to his place, and had enjoyed the spectacle with impunity, till a wife, much interested in the appearance of her spouse, had made an imprudent remark to one of the officers, which revealed the fact. The brass cross instantaneously disappeared, and the blank wall behind it no longer tells any secrets."—The Literary Digest.

A NOVEL WRENCH.

The tool shown in the engraving is adapted for use either as a pipe wrench or a monkey wrench, and has a novel and convenient adjustment for the movable jaw. It forms the subject of a patent recently issued to Murat K. Flye, of Sharpsburg, Texas. In Fig. 1 it is shown in use as a pipe wrench and in Fig. 2 as a monkey wrench; Fig. 3 representing the improvement in perspective. The shank of the movable jaw is connected to the main shank by a yoke whose side plates have longitudinal slots in which is movable a cam lever, and when the latter is at the rear end of the slots, the wrench is especially efficient as a pipe wrench, the yoke then having a rocking movement, which is facilitated by the beveled rear end of the movable shank. The parts are in the position shown in Fig. 3 when the wrench is to be adjusted to a pipe, the throwing down of the cam lever then bringing the jaws into



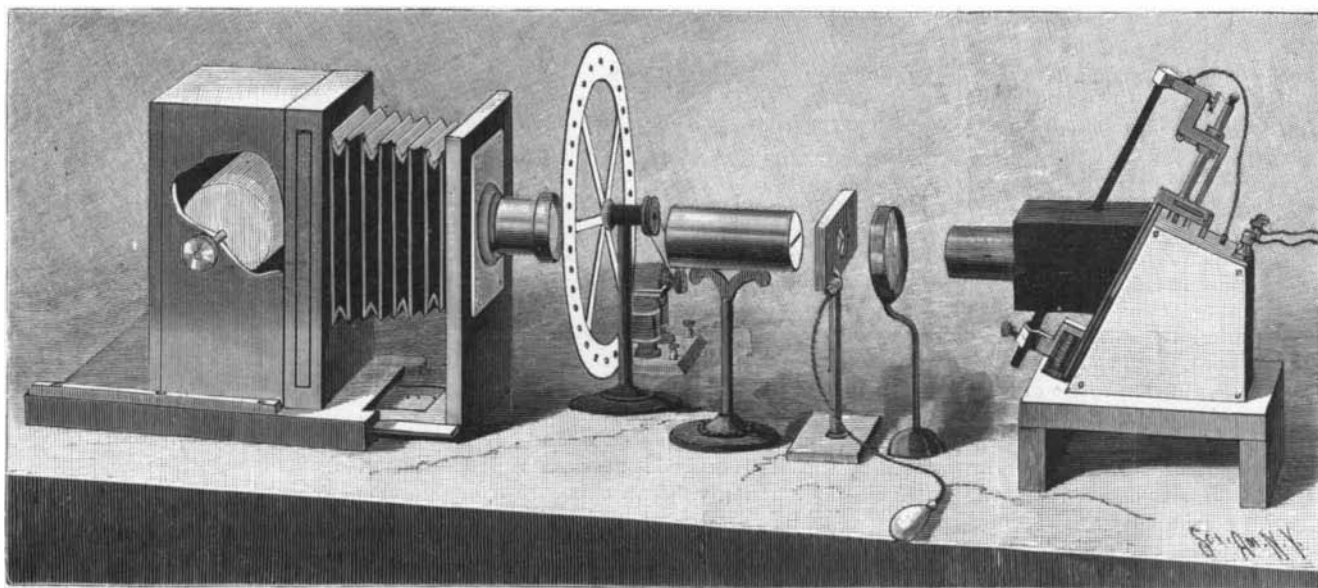
FLYE'S IMPROVED WRENCH.

closer engagement. With the cam lever shifted to the forward end of the slots, as shown in Fig. 2, the sliding shank is brought close to the main shank, and, after adjusting the wrench to a nut, the lever is thrown down, clamping the movable jaw in place, with both jaws at right angles to the body of the wrench.

METHOD OF MEASURING THE SPEED OF CAMERA SHUTTERS.

Captain W. de W. Abney explained before the Camera Club, of London, a short time ago, his method of measuring the speed of photographic camera shutters, which has special advantages as regards accuracy and facility of record, brought about in a somewhat novel manner. In a report of his lecture, which we extract from the London Amateur Photographer, are several interesting facts. The lecturer pointed out that it was

quite as important to know whether we were giving an exposure of say $\frac{1}{10}$ or $\frac{1}{50}$ of a second as one of 5 or 15 seconds. The apparatus enables us not only to measure the time of exposure, but also causes any kind of shutter to draw its own diagram, and from this diagram several things are made known, e. g., how long it took to open, and to close, and how long the working aperture of the lens was fully open, etc.—



APPARATUS FOR MEASURING THE SPEED OF CAMERA SHUTTERS.