The Magnesium Lamp.

According to the *Centralblatt fur Elektrotechnik*, the magnesium lamp invented by H. A. Gratzel, of Hanover, developed the following surprising results. Our authority says:

Since it has been found practicable to produce magnesium electrolytically on the large scale, and the price has consequently fallen within a few years to about one-fifth of its former amount, the attempt has been made to utilize the property of this metal (hitherto little regarded) of burning with great luster, in the construction of sources of intense light. There can be no doubt that with the increasing application of the magnesium light, the technical improvement of the lamps will proceed hand in hand. The burner here measured was made for experimental purposes only, but it yields a light burning with sufficient steadiness.

There can be burnt in this lamp as many as eight magnesium ribbons of 2·5 mm. in width and 0·13 mm. in thickness. It is, however, easy to burn any smaller number at pleasure. Even on burning a single ribbon there was no extinction, as it often happened with the earlier lamps. The strength of the light fluctuates more than in a well-regulated arc lamp, but the fluctuations are more gradual, so that they are perceptible only on the photometer screen, but not with the naked eye. They certainly occasion disturbance, and I have sought to eliminate their influence by increasing the number of observations. The greater the number of the ribbons burning, the smaller is the relative amount of these variations.

The white fume, in which state a part of the oxide formed during combustion escapes, found its exit through the ventilation shaft.

The escape pipe was firmly connected with a reflector attached to the lamp, so that the lamp could not be used without it. But as I wished to ascertain the strength of light which the lamp yields without reflector, it was pasted over with dead black paper. In this manner the strength of light for different numbers of ribbons could be conveniently determined. Lastly, as the concave mirror will be used with the lamp in many cases, the paper was removed, and after the polish of the reflector was restored, measurements were made with the reflector. These results of the latter, of course, hold good only for the lamp in question. The aperture of the parabolic reflector had the diameter of 39 centimeters. This is not the place to enter upon the details of the construction of the burner.

For determining the consumption of magnesium, the rolls upon which the supply of ribbon was coiled were weighed before and after the experiment, and the time during which the lamp was burning was accurately noted.

The strength of light was measured in the horizontal direction. A few determinations made at 33° (greater angles could not be used on account of the reflector) showed a decrease of the strength of the light of about 25 per cent.

Number of ribbons.	Strength of light in normal candles.		Without reflector.		Hourly consumption of ribbon per 100 candles.
	Without reflector.	With reflector.	Candles per ribbon.	Consumption of magnesium per hour ribbon.	
				Grammes.	Grammes.
1	150	8,200	150	16·7	11·14
2	237	5,580	118·7	16·7	14·10
4	450	8,000	112·5	16·7	14·90
6	700	11,300	117	16·7	14·15
8	950	17,000	119	16·7	14·08

The strength of light obtained per ribbon is therefore greatest when only one ribbon is burning. It sinks as soon as a second is introduced, but remains then approximately constant whether two or eight ribbons are in use. The somewhat abnormal result obtained with four ribbons is probably due to an experimental error.

The price of magnesium ribbon is at present 45s. per kilo. If the lamp burns with eight ribbons, it consumes hourly 134 grammes magnesium. If we disregard the first price of the lamp, it costs 6s. per hour burning, and 100 normal candles measured without reflector cost hourly $\frac{88}{100}$ of 1s.

The lamp examined pushes forward hourly 32 meters of each ribbon. This speed appears to be too great, and can be decidedly reduced without reducing the strength of light of the lamp. Some of more recent construction push forward only 24 meters hourly. It appears also that the price of magnesium will shortly be reduced to 30s. per kilo. Hence an eight ribbon lamp would consume hourly 100 grammes of magnesium, at the price of 3s., and the hourly cost of 100 normal candles would be only $\frac{88}{100}$s.

But even this price is still much too high to admit of the magnesium light competing with the electric light or with gas. The natural sphere of the magnesium light is different. It will be used wherever an intense light is demanded for a short time, and where gas piping and electric installations are not at hand. For such purposes magnesium is the cheapest source of light. The magnesium light is readily portable, and can be kindled at any moment by means of a match, and as quickly again extinguished.

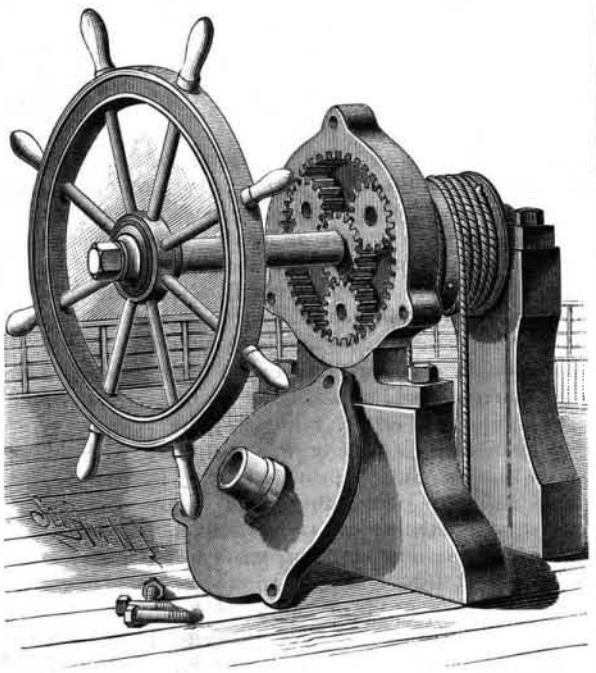
It is thus suited for military purposes, for luminous effects in theaters, in photography, in nightly building operations of short duration, in ships, etc.

Lamps have also been recently constructed arranged for burning several hours (during which the mechanism does not need to be wound up again), and the greatest intensity of light is thrown, not horizontally, but downward. Such burners are already in use for lighting up large halls, etc.

There is no need in electro-technics to fear the competition of the magnesium light, but one should rather seek to improve the preparation of this metal.

AN IMPROVED STEERING GEAR.

In the steering apparatus shown in the accompanying illustration, a drum has a flange at one end, which



SNELLING'S STEERING APPARATUS FOR VESSELS.

carries three or more studs, on which are gears meshing at the same time into the driving pinion on the shaft of the hand wheel and the internal gear in the standard or frame of the apparatus.

The proportions of these gears are such that the power applied to the hand wheel is greatly multiplied at the drum, so that it is only necessary to lead a single part of rope or chain direct to the tiller, obviating the necessity of the usual purchase blocks. The peculiar arrangement of gearing is calculated to give great strength to withstand the strains to which such machines are subjected.

Wheels meshed internally have more of their surface in contact than ordinary spur gearing, and, by the use of several stud gears (where one only is necessary to transmit the motion), this advantage is increased by dividing the strain on several parts of the internal gear, instead of applying it all in one place.

This invention is patented by Mr. J. H. Snelling, 158 South Street, New York, to whom application should be made for further information relative thereto.

To Identify Blood Stains.

Dr. Ferry (*Progress Medical*) advises that the fabric be teased out with a needle, and macerated in a solution 1:1000 of sodium chloride. The fluid will soon become tinged by the blood, and can be submitted to spectroscopic examination. To demonstrate the blood globules, add to some of the fluid a drop or two of a saturated solution of choral hydrate, which will throw down a rose colored precipitate. A drop of the precipitate is to be exposed on a thin plate over the flame of a spirit lamp, and the clear fluid which separates is to be removed by blotting paper. The pellicle of coagulum which remains is to be colored with fuchsin and washed with water. A drop of acetic acid will render the preparation transparent, and the globules will become visible in bright red.—*Pharm. Era.*

Exhibit of Edison Phonograph.

On the evening of May 12 the building of the Electric Club, on 22d Street, this city, was filled with a large number of members of the club and their friends, who had assembled to witness an exhibition of Mr. Edison's new phonograph. Several phonographs were placed in different rooms of the building, each with an attendant who illustrated the manner of working. In one of the rooms of the upper floor a compositor was setting type from the dictation of the phonograph. He received the matter through flexible ear tubes connected with the instrument, and started and stopped the phonograph, and caused it to repeat when necessary, by means of a pedal. In a similar manner, the words of the phonograph were written out by a type writer. In both cases the ear tubes were supported by a yoke passing over the head.

The president introduced Mr. E. T. Gilliland, of the Edison Phonograph Company, who read a brief paper on the development of the phonograph. He sketched rapidly the many improvements which have led to the perfected phonograph. He said that in justice to the inventor he must say that the credit of the phonograph belongs only to Mr. Edison, who was prevented from perfecting it sooner by reason of pressure of other business. Mr. Gilliland's paper was illustrated by lantern slides projected upon the screen. When Mr. Gilliland concluded, the president introduced Prof. Robert Spice, of the Polytechnic Institute, Brooklyn, who gave a short illustrated lecture on sound, with special reference to the phonograph. Among the experiments shown were Koenig's manometric flames, the sonometer, sympathetic forks, and the organ pipe. Prof. Spice's experiments were warmly applauded by the audience.

One of the phonographs then gave a cornet solo, which was loud enough to be heard anywhere in the lecture room. Mr. Edison occupied himself in exhibiting one of his phonographs to a group of friends.

Illustrations of the phonograph were given in our paper for December 31, 1887.

Poisonous Dyestuffs.

A recent occurrence in Lyons has confirmed MM. Arloing and Cazeneuve's conclusions respecting the poisonous character of some *aniline dyes* and the harmlessness of others. Almost an epidemic happened last November with female spoolers working a particular yellow cotton yarn used for gold lace making. Dr. Carry, of the Lyons Medical Society, who was the first to notice the accidents, on being called to attend a spooler, found the patient suffering from a complication of obscure complaints. The most apparent symptoms were weakness, dyspepsia, and vomitings, coupled with a bluish-gray coloration of the gums, extending to the inside of the lips. As the yarn on winding emitted considerable yellow dust, and other working girls were similarly affected, the physician was soon on the right scent. He found that, while the accidents were caused by the dye, some yellows were very poisonous, others less so, and some quite harmless. One sort, giving out much dust, was so dangerous that one working girl had lost, within a short time, two canaries and one cat. The bird's cage hung near her machine, and the cat had probably swallowed the deadly dust with her food.

Next it was found that in a shop, where many girls were employed, no accidents were noticed last summer while the windows could be kept open, but the trouble began in November and December, when they had to be closed. With the new patients Dr. Carry had full opportunity to observe all the symptoms. Besides those already mentioned, which mostly relate to the digestive functions, others pertaining to the nervous system were noticed, such as persistent cephalalgia, insomnia, and an analgesis of the skin so complete that pin pricks could not be felt. At the same time the circulation was normal, there was no fever, and no albuminuria.

Some twelve or fifteen women were under treatment for the same complaint, and the recovery was in all cases very slow. But the accidents were too evidently caused by some poison to be thus dismissed without further investigation. Lead, the first that suggested itself, was looked for by a Lyons pharmacist, but proved absent. Three different specimens of dust were next given for thorough analysis to a specialist—Professor Pouchot, of the Martiniere school—who confirmed the absence of lead, but found traces of antimony used as a mordant.

The first specimen, the most poisonous, was found to have been dyed with *sodium binitronaphthol*, generally known in trade as *Martin's yellow;* the second, less poisonous, with Poirier's light binitronaphthol; and the third, quite harmless, with sodic sulpho-conjugated binitronaphthol. Experiments on animals confirmed the chemist's report. Dr. Carry did not feel justified in concluding that goods thus dyed are dangerous to the wearers, but they are certainly to the weavers; and since yellows, equally good but harmless, can be obtained at a slightly higher cost, he thought the poisonous dyestuffs should be prohibited, or such ventilation enforced as to protect the working people from the dangerous dust.—*Therapeutic Gazette.*