Correspondence.

Carbon Monoxide in Gas Flames.

To the Editor of the SCIENTIFIC AMERICAN:

I saw the statement made by a correspondent of one of your contemporaries that the products of combustion of an ordinary gas flame used for light included carbon dioxide (CO_2), and that of a Bunsen burner carbon monoxide (CO), a very poisonous gas, and said correspondent wanted some chemist to inform him as to the quantity of CO given out by Bunsen burners, as the latter were being extensively used at present for lighting in connection with incandescent mantle gas burners. My impression has been that the more perfect the combustion the less luminous the flame, which would indicate that the Bunsen burner consumed gas more completely than an ordinary gas jet; so that if either gave of any CO. I should expect it to be the gas jet rather than the Bunsen burner. A little light on the subject from you will greatly oblige a reader.

Decatur, Ill. FRANK SHLAUDEMAN.

[Non-luminous flames are the most liable to produce carbon monoxide. The luminous flame, with proper burner, is the safer in this regard. If anything is done to cool a non-luminous flame, such as inserting a heavy wire gauze in it, the gas in question is very apt to be produced along with other products of incomplete combustion. But a proper Bunsen burner gives perfect combustion and is perfectly safe. You will always know if carbon monoxide is being produced, generally by the odor of the accompanying products of incomplete combustion and by the headache which it will soon produce.—ED.]

The Phenomenal Growth of Potatoes.

To the Editor of the SCIENTIFIC AMERICAN:

My letter published in the SCIENTIFIC AMERICAN of January 25 brought me in the first mail 85 letters of inquiry, and they have been arriving continually ever since. It looks as though every farmer in the United States reads your paper. It would be impossible for any one man to answer all these letters, some having written three times, but the main questions can all be answered in a few lines. If you will publish them, I will send a set of questions and answers for the benefit of your readers. There appears to be a great mystery surrounding the sprouting of potatoes in boxes and barrels without earth. C. E. FORD.

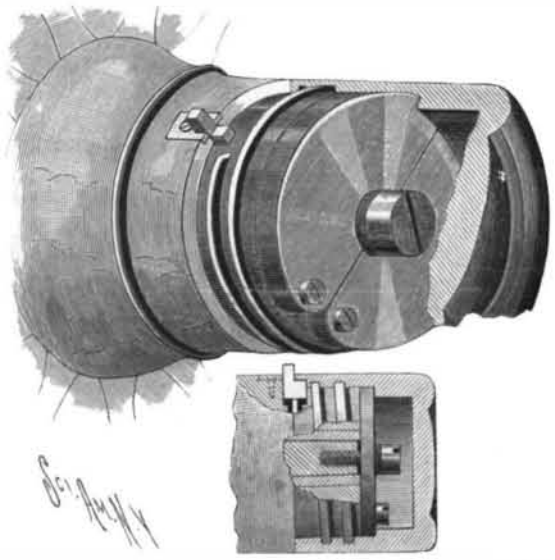
Rush, Texas.

[We have arranged below the questions received by Mr. Ford and have appended the answers.]

1. Q. At what temperature do you keep your sprout house? A. Summer heat, or 80° to 90° F. 2. Q. Will a stove answer for heating the sprout house? A. Yes. 3. Q. Do you put earth or anything in the barrel with the potatoes? A. No. 4. Q. Do you put water on the potatoes? Is extra moisture required in the sprout house? A. No. 5. Q. Do you cut the potatoes before putting them into the barrel, or do you put them in whole? A. Put them in whole. 6. Q. In planting, do you separate the young potatoes from the old mother potatoes? A. No; plant all together. 7. Q. Are not many of the small potatoes broken off so that they will not grow? A. About one-tenth of them are broken off. A wooden paddle or trowel is used to separate those that are to be planted. A wooden paddle injures the roots and potatoes less than an iron trowel. 8. Q. What is a "balk"? A. A ridge of land left unplowed between furrows. It is left in a ridge with inclined sides by leaning the plow to the left. The "balk" gives more surface for the expansion and growth of the young potatoes. 9. Q. What is meant by "water furrow"? A. A bead is made by making two or more furrows together. The lowest ground between the beads is a "water furrow." 10. Q. How do you prepare your liquid manure? A. I have a large number of cattle which I keep in a pen every night, and the manure gets very deep, and when it rains the water runs from the pen to the potatoes; and if it does not rain when I want to irrigate my potatoes, I run the water into the cattle pen first and drive the cattle round and round, stirring up the manure, which I then run into the potatoes. 11. Q. What kind of fertilizer do you use and how much? A. I use cotton seed, covering the ground 4 to 6 inches deep for one crop. For the next crop I use green cow manure, covering the ground 6 to 10 inches deep. It is impossible to get the ground too rich. My soil is sandy and about 3 feet in depth before the clay is reached. 12. Q. What kind of seed would you recommend for growing potatoes by your method? A. Any kind that grows best in your locality. 13. Q. Do you irrigate, and how often? A. Yes; continuously. If the potatoes become dry, they will cease to grow. 14. Q. Can I obtain potato seed from you? A. I have no potatoes to sell. 15. Q. Can I use your system in New England and Canada? A. Yes. 16. Q. Do I understand that a crop of potatoes can be grown every 4 or 6 weeks? A. In Texas, yes. The potato grower can answer this question for his own locality by observing how long it takes for a potato to grow from the size of a small marble to a size suitable for eating or marketing. I grow the potatoes in the sprout house until they attain the size of marbles; then they have all the roots and begin growing immediately when planted. It is probable that in Canada and New England two crops could be grown without trouble. 17. Q. Why do you plant your hills across the rows and not lengthwise? A. To secure an even distribution of the potatoes.

SECURING VEHICLE WHEELS TO AXLES.

A device which can be operated without the use of tools, to attach or remove the wheel, locking the hub so securely to the axle that it cannot be accidentally removed, is shown in the accompanying illustration, one view showing the improvement applied, with a part of the cap broken away, while the small figure is a sectional view. The improvement has been patented by William F. McQuivey, of Seattle, Washington. The hub has an end plate which fits around the end of the axle, a flange of the end plate overlapping the face of the hub, and being provided with a coarse thread to engage a screw cap. Pivoted to the end plate are semicircular locking plates, with semicircular recesses fitting around a screw projected from the end of the axle, there being a washer between the head of this screw and the locking plates. Fitting snugly over the end of the hub and against the locking plates is a screw cap which has at its inner edge a recess engaging a catch movable in and out in the hub, the catch being normally pushed outward by a spring, and having a projecting thumb piece. On pushing the catch inward the screw cap may be unscrewed from the hub. With this improvement the axle may be more easily lubricated than where the ordinary nut is used, and without soiling the hands or the clothing, and the device adds to the neatness and good appearance of the wheel.



McQUIVEY'S DEVICE FOR SECURING VEHICLE WHEELS TO AXLES.

Mannocitin.

The rust-preventing compound "mannocitin" is the invention of Edmund Muller & Mann (chemical works) of Charlottenburg, near Berlin, Germany, and is manufactured exclusively by that firm. The article was put on the market in Germany in January, 1892, and has since been adopted by German state railways, by the leading iron and steel works, by engine and machine builders, tool manufacturers, etc. It is extensively used by all trades making and using machinery, as is evidenced by a large number of trustworthy testimonials. Besides railways, iron, steel, machine, and tool companies, the following are users of mannocitin, viz, steamship companies, shipbuilders, mines and smelting works, gun works, bicycle and sewing machine factories, flour mills, gas and water works, departments of public works, stove works, glass works (for use on iron moulds), breweries, textile manufactories, paper and pulp mills, beet sugar refineries, watch makers, metal workers, and machinists. These trades are enumerated to show that the article is of interest to all industries manufacturing, dealing in, or using machinery or metal goods of any description.

In Germany, where the manufacturers first introduced their compound, it is largely used, as it is also in England, France (where it was awarded a medal at the Bordeaux Exposition in 1895), Austria, Norway and Sweden, Russia and other European countries. Wherever it has been properly employed, mannocitin has given good results.

This compound is composed of greases and volatile oils. The compound is very thinly applied on the metal, which should be clean and dry. The volatile oils evaporate after application to the metal, and there remains a thin film or skin which tightly adheres to the metal and forms the coating, which affords complete and permanent protection and prevents rust and corrosion.

The advantages claimed for mannocitin are: That it is absolutely neutral, containing no acid, and it does not take up any acid from the air or water; an article once coated with mannocitin is protected as long as the mannocitin coating is allowed to remain on; it consequently protects the metal for years. The mannocitin coating forms a protection against salt air, dampness, fresh water, salt water, perspiration and fumes of muriatic acid and ammonia. This compound has the advantage of spreading and thereby covering a very large surface. With one gallon, a surface of over eleven hundred square feet can be protected.

It may be easily applied with a rag and is always ready for use; it does not rub off in handling, and is not absorbed by dust or by paper wrappers (this is of great advantage in the case of small tools). It is quickly removed with turpentine or benzine, and as it is removed simply with a rag saturated in one of these liquids, scratching the metal is avoided, and the original polish of the metal is preserved. It can, therefore, be used on the most delicate metal surfaces, such as engravers' steel plates. As the mannocitin coating is transparent it does not discolor the metal or injure or spoil its appearance. Mannocitin has a very high melting point, and can therefore be used on boilers without melting. It is not of the nature of a paint or lacquer, and it is not a petroleum product.

The article is applicable to the smallest and finest tools, as well as to the largest machinery. It is put up in small cans for the individual user and in larger cans and barrels for a large manufacturer.

Mr. Otto Goetze, of New York City, has charge of the business relating to mannocitin in this country.

Nuts on Wagon Axles.

Every now and then one hears of a wagon wheel coming off through the loss of a nut, and an accident of this sort is apt to be attended with further injury to the vehicle or its load. If the latter is heavy, the end of the axle is liable to strike the ground abruptly enough to break off a portion, or at least to spoil the screw thread. This thread, by the way, is righthanded at one end of the axle and lefthanded at the other, so that the nut in going on turns in the same direction that the wheel does when the wagon is moving forward. If the wheel exerts any influence on the nut through friction, therefore, its tendency usually would be to tighten the nut. It would only be in backing, apparently, that the nut could be loosened from that cause. It is surprising, perhaps, that such a thing should happen at all, but it does, and a good many people, farmers and blacksmiths, have wondered how it could best be prevented.

A generation or two ago some carriage makers put a pin through the nut and the axle top. This of course would serve well enough for a while, but after the nut had been removed several times, in order to allow the axle to be greased, the thread would be worn a trifle. Hence, if the nut were tightened up properly with a wrench, the hole would not be in the right place for the pin. One of the Tribune's subscribers recommends a slight improvement on that plan. He fixes a coil spring in the aperture in the nut into which the pin is inserted, and the spring tends to thrust the pin into place when the nut is on. But the improved plan does not seem to meet the objection just mentioned.

Another scheme, which has been tried with great success on fine carriages for many years, is to have two nuts, one going on after the other, and each screwing in a different direction. A pin ties the two together, and the double nut is thus perfectly locked. The patent on this idea ran out long ago, and there are several makers of this style of axle. But one must pay an extra price for it. This is the most efficient plan in use, probably; but it has been suggested that nuts, not only on axles, but also on the bolts through the ends of the springs, might be kept in place by using spring washers, such as are now employed in certain parts of a trolley car gear, and as nut locks for railway track bolts. Again, a wonderful grip is secured in one of the track bolts lately introduced by cutting the thread in a peculiar way. The same scheme ought to work on a wagon axle.

However, there are plenty of country wagons and city trucks, some of which are used in hauling enormous loads over rough highways, which are provided with no special means of securing the nuts, and yet which never lose one. The secret of this, probably, is that the nuts are well fitted, and are closely watched. If the nut pinches tightly enough, and if the screw thread is kept free from grease when the wheel is off, no accident of this sort ought to happen. But when the nut is worn by long service, and goes on too easily, there is always a certain amount of risk, especially if a man is careless in greasing the wheels. And such a man, too, will probably neglect to examine the nuts occasionally and try to tighten them with a wrench.

New York Tribune.

Electricity in Dentistry.

Dr. M. G. Jenison, of Minneapolis, reports that electricity has been successfully employed by him in checking hemorrhage from the extraction of teeth. The current, he states, caused instant coagulation of the blood and gave relief where the usual remedies were without effect.