memoirs in the transaction of the Academy of Sciences of Paris should also be continued.

RECENT AMERICAN PATENTS.

Marking Wheel.—This invention consists in a revolving type wheel arranged in a suitable handle in combination with an ink roller, in such a manner that by carrying the type wheel over the cover of a bed, orover any other surfaces, the types on the wheel produce an impression, and the marking of a box or other article can be effected neatly and distinctly with little loss of time. The ink roller is composed of a hollow cylindrical reservoir perforated with small holes, and surrounded by a strip of cloth or other absorbent material, so that the same is capable of holding a supply of ink for a large number of impressions. The type wheel is provided with yielding rims or flanges made of india-rubber or other elastic material, so that the types can be depressed on the surface to be marked with the requisite force to produce the desired impression, and a coiled or other spring is applied to said type wheel, in such a manner that it carries the same back after each impression to the starting point, and thereby the types are brought in contact with the ink rollers and supplied with the requisite quantity of ink for the subsequent impression; and, furthermore, the type wheel readjusts itself in the required position for starting. Horace Holt, of No. 264 Broadway, New York, is the inventor.

Checking the Recoil and Operating and Pointing Cannon.—Much time is lost in the ordinary method of controlling, by means of friction, the recoil of heavy guns, in consequence of the time consumed in tightening and relieving the compressors which produce the required friction. Much danger is also incurred in working heavy guns on board of ships during bad weather at sea because the compressors must be relieved in order to roll the gun out after being loaded. Any sudden lurch of the vessel while the compressers are thus relieved, renders the gun uncontrollable, and endangers the lives of the gunners as well as the safety of the gun and carriage. Much difficulty and danger are also experienced in training or pointing heavy guns on board of ships, particularly during bad weather. The object of this invention is to overcome the difficulties thus enumerated. In order to save the time lost in tightening and relieving the present friction gear of gun carriages, a rotary compressor is employed, kept under constant pressure, composed of a series of circular metallic disks secured to an axle which passes through the side frames of the gun carriage, this axle having attached to it pinions, the teeth of which work into toothed racks bolted to the inside of the gun slides. Between the metallic disks are inserted wooden ones fixed within a cylindrical box made of brass or iron, the circumference of which is provided with cogs. Into this toothed cylindrical box wheel is geared a pinion, which, by means of suitable hand gear, enables the gunners to run the gun in and out; and by it the box wheel may also be instantly locked, and the movement of the gun carriage thereby checked at any time. The training or pointing the gun is effected by means of a toothed rack attached to the slides upon which the gun carriage moves, said rack being actuated by a pinion attached to the lower end of a vertical shaft which the gunners turn round by means of winches and cog wheels. John Ericsson, of New York City, is the inventor.

Wood-tenoning Machine.—This invention consists in so arranging the cutter heads of a wood-tenoning machine, that while they can be adjusted with regard to each other, to any thickness of tenon which it is desired to form, they can be, after such adjustment, brought to any position with regard to the end of the board or plank upon which they are to operate without disturbing their relative position with regard to each other, as previously adjusted. H. B. Smith, of Lowell, Mass., is the inventor.

Glass Mold Board for Plows.—Messrs. O. F. Burton, of this city, and L. B. Hoit, of Cedar Falls, Iowa, obtained a patent through this office, on the 9th inst., for making mold boards for plows, of glass! The idea is quite novel, but we are told that on the prairies they have been tested with the best practical results.

PATENT-OFFICE DECISIONS.

Application for patent for improvement in steel-facing vises and various other articles of iron.

S. C. Fessenden, for the Board.—The applicant says:—"I do not claim the brazing process of itself; neither do I claim the hardening of steel by heating it, and subsequently suddenly cooling it. But what I do claim as my invention is, the combination of the two processes of brazing and hardening the piece of steel, or facing, with that of so firmly holding the facing piece of steel to the iron while the hardening process is being carried on, as to prevent the displacement or escape of the brazing metal from between the contiguous surfaces against which it may be." The Examiner rejects the application; first, on the ground that the specification presents no patentable feature; and second, that the patent already granted to the applicant, No. 44,739, covers all the improvements which he claims.

We have compared the Letters Patent, No. 44,739, with the application now under consideration, and we fail to perceive that the specification in said application is similar to any specification in the former Letters Patent, and for which the patent was issued. It is well put, that, in the Letters Patent, the invention covered consisted in brazing and hardening the steel under one and the same heating of it, such as may be requisite for effecting the melting of the brazing metal to accomplish the brazing.

In the new process, the tempering of the steel facing of an article is not accomplished under the heat produced by brazing of the facing to the article, but after the process of brazing has been completed, and the steel is in a soft state, the article is filed and finished.

To harden the steel facing requires a re-heating of the article. Under ordinary circumstances this would be destructive of the brazing, as it would melt the brass, which would run out of the joint.

Evidently the one process is not the same with the other. N. claims that he has discovered a process by which this loss of the brazing is prevented, which is both novel and useful. He describes this process. It is that of so firmly holding the facing to the article, in connection of brazing and reheating, by a clamp, as to cause them to retain the brazing in position between them.

It is true that "the mere matter of clamping articles together for any purpose is not new;" but the matter of clamping them together for this purpose, although very simple, apparently, is new.

It was held by Mr. Chief Justice Marshall, in David vs. Palmer, 2 Brock 298:—"That it was not every change of form or proportion which was declared to be no discovery, but that which was simply a change of form or proportion, and nothing more. If by changing the form and proportion a new effect is produced, there is not simply a change of form and proportion, but a change of principle. The question will be, therefore, whether the change has produced a different effect.

Here the clamping is to a certain degree accompanied by certain effects which could not otherwise be produced, and without which there would be no improvement, as alleged. By the affidavits of experts, N. shows, moreover, that his process is in its results as described by him in his application.

In the opinion of this Board, the decision of the Examiners in this case should be reversed.

Washington, Dec. 20, 1865.

THE USE OF AMMONIA AS A MANURE.

It is a curious fact that plants cannot obtain the nitrogen that they need from the atmosphere, but that this element must be supplied by costly manuring. What makes this fact so curious is, that only 2½ per cent of the substance of plants is nitrogen, while this element forms the principal portion of the atmosphere—76·9 per cent. Furthermore, plants obtain their carbon, which forms about half of their substance, principally from the atmosphere, although the proportion of carbon in the atmosphere is not more than one-seventh of one per cent. The explanation of this is of course to be found in the relation of the chemical affinities.

Of all the eighty elements at present known, nitrogen has the feeblest affinities. It has no desire to enter into union or combination with other substances. It is the old bachelor—the recluse—the solitary among elements. It prefers to exist in its free uncombined state, rather than in combination or union with any others; and if, in exceptional circumstances, it is induced to combine with other elements, the slightest cause is sufficient to break up the union and restore nitrogen to its free and independent existence. In the atmosphere it exists in company with other substances, but though with them it is not of them—the association is a mechanical mingling—not the close union of chemical combination.

Before nitrogen can enter into the constitution of a plant it must be induced to combine with some other element which will carry it in. A plant may be perishing for want of a few grains of nitrogen, and though three-fourths of the wind that fans its leaves are constituted of this element, not a single particle can it drink in to save its existence. This was long in dispute, but now seems to be settled. Dr. F. Grace Calvert, in a recent lecture before the Society of Arts, England, after a very learned summary of the investigations on the subject, remarks—

An animated discussion, based upon a long series of researches, ensued between Boussingault and Ville, the latter contending that plants could absorb nitrogen from the atmosphere and fix it as a part of their organism; the former contending that the nitrogen contained in plants was derived either from ammonia or nitric acid. This discussion was still proceeding when Mr. Lawes and Drs. Gilbert and Pugh published, in the "Memoirs of the Chemical Society of London," 1863, such a complete and elaborate series of researches that chemists came to the conclusion that the nitrogen existing in plants was not derived from the atmosphere as nitrogen. There can be no doubt that the general tendency of scientific as well as practical investigation, as above stated, proves that it is most probably under the form of nitric acid, or more so in a state of nitrates, that nitrogen penetrates into plants, and becomes one of the essential elements of the formation of albumen, fibrin, legumin, or other nitrogenated substances which are found existing in vegetables.

An atom of ammonia is composed of three atoms of hydrogen and one of nitrogen, $N H_3$, and as an atom of nitrogen is fourteen times as heavy as an atom of hydrogen, the proportion by weight is three pounds of hydrogen to fourteen of nitrogen. Ammonia contains more nitrogen in proportion to its weight than any other compound. Nitric acid is composed of nitrogen and oxygen in the atomic proportion $N O_5$, and as the atomic weight of oxygen is 8, the proportion by weight is forty pounds of oxygen to fourteen of nitrogen. Dr. Calvert concludes that the nitrogen is first taken from ammonia to form nitric acid before it enters into the combination of plants. He says—

If the conversion of nitrogen into nitric acid, under the influence of certain mineral substances, has been known by its results for a long period in what is called the nitrification in the walls of our dwellings, still the demonstration of the conversion of ammonia into nitric acid is the result of comparatively recent researches.

The most interesting series of researches published on this subject are those due to M. Millon, which you will find in the "*Comptes Rendus de l'Academie de Sciences*, 1864," in which he has shown that the production of niter is in ratio with the quantity of vegetable matter, especially humic acid, that a soil contains, and that the most favorable land for the production of niter is that which is called mold by gardeners. He further ascertained that if he made a mixture composed of ordinary earth, 20 parts, ashes 4, mold 3, the production of niter was most active, and also that the oxygen of the air had a great influence on its production, converting the ammonia resulting from the decay of the organic matter into nitric acid.

These facts are well illustrated in the following table quoted from his researches:—

	Nitrification.	Parts.
Soil	Earth	20
	Ashes	4
	Decayed manure	3
		Quantity of Niter.
Upper layer		440
Middle layer		441
Bottom layer		009

From the above you will gather that in the upper part of a bed (one meter in depth, and composed as above shown) there is far more niter than in the lower portions of it. These researches of M. Millon threw much light on those published some years since by M. Bonssingault, who ascertained the rate of proportions of niter that existed in various qualities of soils and also the influence of manured land on the production of niter in soils. Thus, M. Boussingault found that the quantity of niter in non-manured land was a mere trace; in uncultivated land there were from 1 to 0·5 in 1,000 parts of soil, while in cultivated land, and in highly-manured ground, 18 parts in 1,000. He further observed that if he manured a piece of land, after 7 days there were 12 parts of niter per 1,000; in 17 days, 81 parts; in 15 days more, 233; in 15 days more, 280; and in 15 days further, 260; and then the quantity decreased rapidly.

Continental Telegraphic Convention.

An imperial decree has just been published in Paris promulgating a convention, concluded in May last, between France on the one part, and Belgium, Austria, Baden, Denmark, Spain, Greece, the city of Hamburg, Italy, Holland, Portugal, Prussia, Russia, Saxony, Sweden and Norway, Switzerland, Turkey and Wurtemberg on the other, and which has for its object the organization of the entire telegraph system, and the establishment of a fixed international tariff. The dispatches are classed under three heads—those of the State, or Governmental dispatches, those connected with the public service, and, lastly, private telegrams. The tariffs will affix the amounts to be received by each country as regards transmission, receipt, and transit. The ratifications have been exchanged between all the powers, with the exception of Greece, Portugal, and Turkey, in which there has been some delay, and the convention was to come into operation on the first day of the present year. This arrangement will be of essential service to the commercial world by doing away with inconsistencies, and setting up a regular and fixed scale of charges.