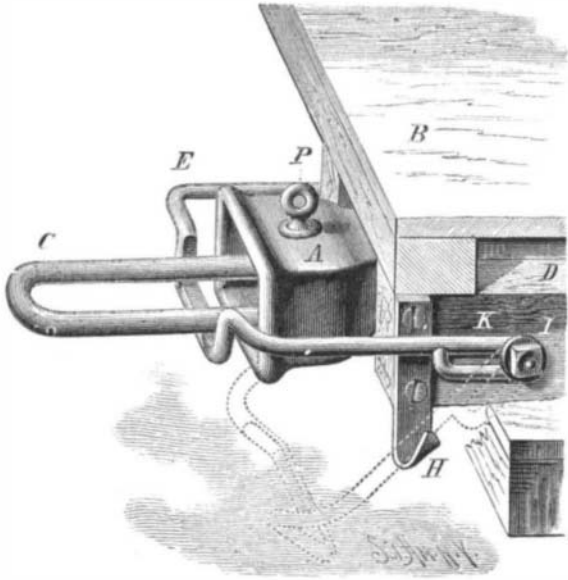


NEW CAR COUPLING.

This invention is the outcome of a long and continued observation of all appliances and devices used in coupling cars where any ordinary link or pin is used, and an extensive acquaintance with many unfortunate brakemen and yard men who have been crippled for life by being caught between two meeting drawheads.

This invention consists of a swinging bail, E, which may be pivoted to the sides of the drawhead, or to the longitudinal sills, D, placed on either side of the drawhead.

The bail, E, is bent downward in front to receive and raise the link in proper position for entering the opposing drawhead, the ends of the bail being arranged with slots, K K, which allow it to yield to any stroke or pressure it may receive from the opposing drawhead.

**JOHNSON'S SAFETY CAR COUPLER.**

The construction and operation of the coupler may be easily understood from the cut, in which B represents a broken off portion of the platform of a car, A an ordinary drawhead, C a link, and P a pin. DD are longitudinal sills, to which the bail, E, is pivoted by means of bolts or screws, I I, a portion of the platform being broken away to show the same. H H are supporters upon which the bail, E, rests when not in use, as shown by dotted lines. The operator takes the bail on either side, raises it up, and with it lifts the link and holds it in position to enter the drawhead of another car. When released from the operator's hand it falls down and out of the way and remains in position for use.

The bail may be easily and cheaply made, as it may be all bent on forms from a single bar of iron. This coupler is very cheap and simple, and can be adjusted to any freight car or caboose without changing car or bumpers. It is worked from either side of the car with or without a lever, alleviating the necessity of reaching in between the two meeting cars for the purpose of guiding and lifting the link.

The bail itself is a protection to the operator against falling, especially when the cars start unexpectedly, as is often the case.

This invention has been tested in the Wabash car shops of Toledo, and found very satisfactory.

For further information address Mr. Ferdinand Johnson, 237 St. Clair street, Toledo, O.

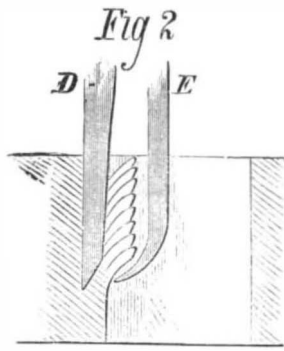
IMPROVED MORTISING MACHINE.

The engraving represents an improved mortising machine recently patented by Mr. John C. Fiester, of 320 South Eleventh street, Reading, Pa. The object of this invention is to provide means for the automatic removal of the chips from the mortise as they are made by the chisel.

The larger engraving is a front elevation of the machine. The smaller one shows the manner in which the chips are removed from the mortise. The crosshead, B, has a vertical reciprocating motion between housings, and is fitted with lugs at the top and bottom, as guides for the chisel mandrel or carrier. Between the lugs on the chisel mandrel is placed a slotted sleeve, C, fitted at its upper end with a collar having a recess or indent, a curved spring pressing the upper end of the lever, E, and a projection or cam capable of engaging the lever. The sleeve, C, is fitted at its lower end with a stop collar, the sleeve passes through the adjustable trip guard, A, and reciprocates with the crosshead, less the length of slot where it slides on a starting pin. The trip guard, A is made adjustable vertically by wing nuts and slots, the object being to permit of its adjustment to suit the respective positions of the sleeve as the crosshead, B, is set to suit different thicknesses of timber in mortising, the guard, A, always requiring to be adjusted relative to the positions of the sleeve in order to assure the actuating of lever, E, at the proper time. Fitted to the chisel mandrel

there is a chisel socket, D, to which is pivoted the lever, E, curved near its lower end to permit its grasping the chips.

The operation of this machine is as follows: The timber

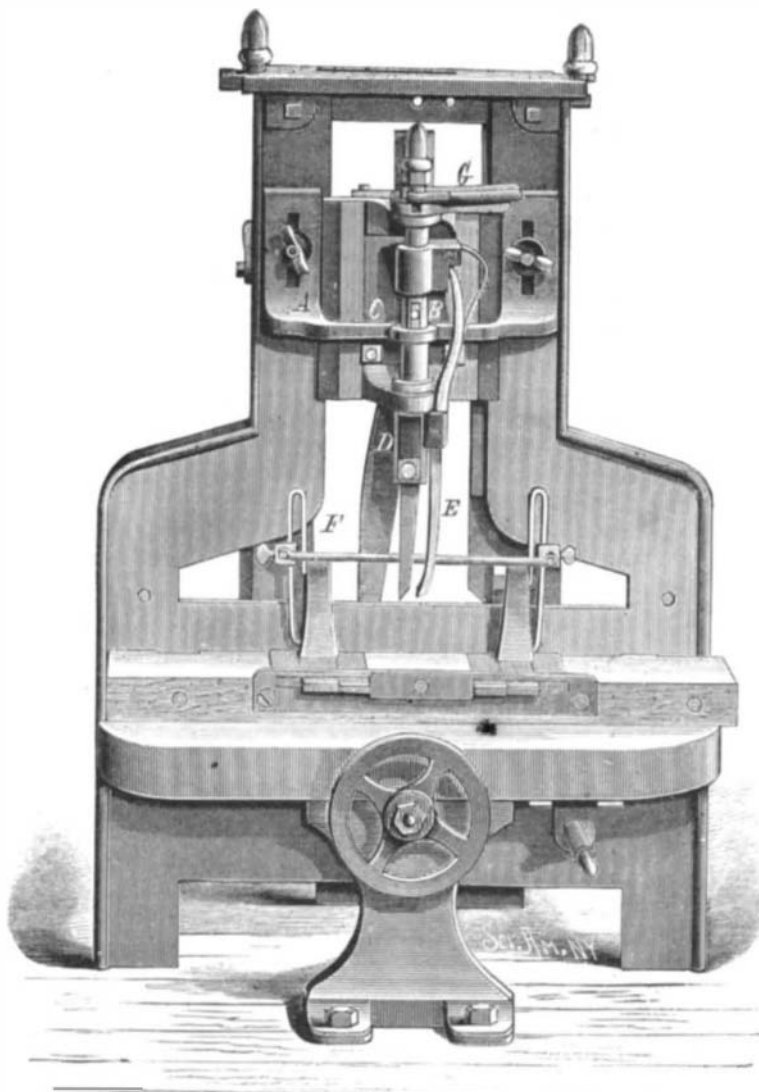


being secured to the table, the crosshead, A, is then set to the proper height relative to the length of chisel and thickness of timber. The reciprocating motion is imparted to the crosshead, D, by a crank or eccentric. It is provided with an extension pitman to permit of adjustment of crosshead to various positions of vertical adjustment relative to the position of the crank and thickness of timber worked. One or more holes are bored to permit the entrance into the mortise of the lever. The trip guard, A, is then set in such position relative to the travels of the sleeve and chisel mandrel respectively, that it will arrest the travel of the sleeve by contact with the collar on the upper end of the sleeve just as the chisel is at the bottom of the mortise, and permit the mandrel to pass the length of the slot in the sleeve below the bottom of the mortise, and allow the lever, E, to grasp the chips and remove them from the mortise, as shown in Fig. 2.

Further information may be obtained by addressing Messrs. Fiester & Ammon, 320 South Eleventh street, Reading, Pa.

Hilo Escapes the Lava Flow.

The *Advertiser*, of Honolulu, Sandwich Islands, says in its issue of August 24: "The lava flow, which has so long been threatening Hilo, may at last be regarded as at an end. In fact, it is quite impossible for it to come down again by the same channel which it has been using for the past nine months. As the support of the flowing lava in the tunnel beneath has been withdrawn, the roof has cooled, contract-

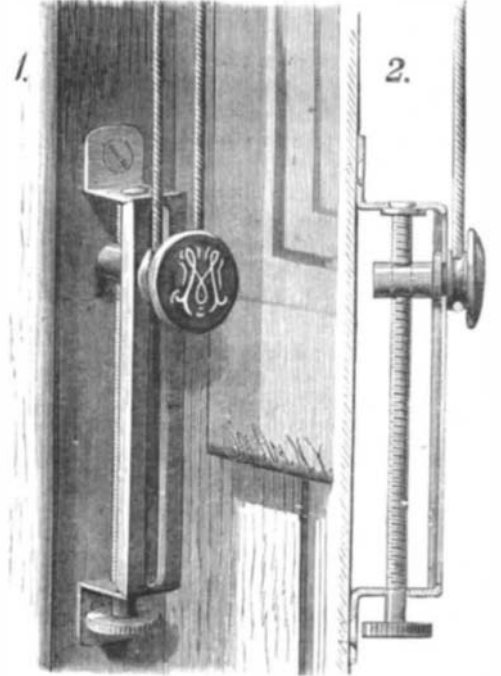
**FIESTER'S MORTISING MACHINE.**

ed, and fallen in, thus blocking up the tunnel, and also affording countless vent holes by which the molten mass might escape, even if it could overcome the obstacles offered by the debris which strews its path. A gentleman who has given careful and scientific attention to the flow, tells us that he had followed its course for over six miles, and that for the whole length of that distance the roof had caved in, say, every 150 feet or so. Another favorable indication of the cessation of the flow is the dense black smoke which is

now rolling up from the terminal crater. This has usually been noticed at the close of former eruptions and flows. As long as the flow continues to advance, as long as the liquid lava pours out, the smoke is of a whitish color, but as soon as it becomes black, the danger, as a rule, may be regarded as at an end."

IMPROVED CURTAIN-CORD TIGHTENER.

We give an engraving of an improved curtain cord tightener patented by Messrs. F. E. Porter, of Baltimore, Md., and D. A. Beatson, of New York city. This tightener is mechanically correct in principle, simple and cheap in con-

**IMPROVED CURTAIN-CORD TIGHTENER.**

struction, and perfectly answers the purpose for which it is intended.

The frame of the device consists of a suitable piece of sheet metal having a longitudinal slot, and bent twice at right angles at either end to form ears, which are perforated for the securing screws or tacks. This portion of the device is conveniently struck up at one operation by means of a die.

A screw extends from end to end of the frame, being secured after the manner of a rivet at the upper end, but being free to turn. At the lower end the screw is furnished with a milled head. A threaded block is mounted upon the screw, and to it is secured a roller. This roller receives the curtain-cord, whose tension may be readily regulated by turning the screw by means of the milled head.

Further information in regard to this invention may be obtained by addressing Mr. F. E. Porter, 33 South Charles street, Baltimore, Md.

RECENT INVENTIONS.

Mr. Theodore D. Lockling, of San Mateo, Costa Rica, Central America, has patented an improved method of securing covers to umbrella frames, so that they can easily be changed at will. The invention consists of the combination with the handle and notched and perforated ribs of an umbrella, of elastic rings, clamps, clips, and loops.

An improved watering pot has been patented by Mr. George F. McIntosh, of Hallowell, Me. The object of this invention is to facilitate the convenient changing of the delivery nozzles of the pot and prevent waste of water in supplying potted plants. The watering pot is provided with a closed top, upper and lower orifices to receive changeable nozzles, and a filling aperture and funnel on the rear above the handle.

In some of the Southern States there are large tracts of land that are infested by the "cutting ant," which destroys all vegetation, some of these tracts being literally undermined by them. Mr. Hiram B. Gray, of Columbus, Texas, has patented an improved apparatus for destroying these pests by blowing into their nests sulphurous or other poisonous fumes.

An improved table-leaf support has been patented by Mr. Horatio J. Locke, of Belfast, Me. The main object of this invention is to improve table-leaf supports so that the spring will only be allowed to exert its greatest power when supporting the leaf.

Mr. Joseph C. Higgins, of New Brunswick, N. J., has patented a detachable calk for horse-shoes, which can be attached to or detached from the shoe without removing the shoe from the horse's hoof.

An improved winding roller for looms, etc., has been patented by Mr. John Connelly of Hallowell, Me. This invention relates to cloth-winding rollers used with looms to receive the cloth, and paper machines for winding the paper, and in winding web of other material, the object being to allow convenient removal of the material after being wound.

Protection in England.

To a country without competitors free trade may be a good thing. But when foreign competition arises to cut the ground from under the home laborer or to prevent the establishment of new industries free trade does not appear to work so well. Of this truth England is now gaining bitter experience; and as a natural consequence the more intelligent manufacturers are taking ground against free trade in favor of protection of home industry. As an illustration of the manner in which closet theories go to the wall when faced by the stern necessities of actual business life, nothing better could be asked than this change of front by many English manufacturers. The practical working of free trade in their case is forcibly put by Mr. John Lister, of Bradford, the founder of the vast silk business of that town, based on his patented silk and velvet looms. Explaining to a correspondent of the *Times* his reasons for subscribing \$10,000 to the Fair Trade League, he said:

"A few years ago my looms were idle, while London was flooded with German velvets. I was undersold. For two years I paid my workpeople out of capital. In that time, however, I had considerably reduced their number, and their wages were not nearly as much as they are now. At the time I speak of we were also beaten not only in velvets, but the Swiss spinners were even sending their yarns into Bradford. Supposing that I had been a weak capitalist, and this German confederation had overthrown me—what then? The free trade theory, that if one trade cannot supply laborers another can, would have been put to a severe test. Could the worsted trade of Bradford have employed my thousands of workpeople? No, sir. Could it do so then or now, or is there any other trade that could? None. In a recent lecture I gave this as an illustration to show how necessary it is to see how the laboring classes are to be employed before you allow one industry after another to be destroyed by foreign competition. Let us look a little further. I pay £1,000 a year poor rate. What if I had closed my mills and ceased to pay that or anything else? And, supposing, instead of paying £1,000 a week and more—£52,000 a year and more—out of my own pocket to support my workers, the poor rate had been charged with it, what then? I think some of the free trade ratepayers would have found out the practical effects of unrestricted foreign competition. What pen or tongue can say what my workpeople would have suffered? And for whose benefit? Certainly not for mine, for had I been a weak capitalist and gone to the wall, I should have been one of the chief sufferers. For whose good, then, would all the misery have been suffered? For the good of the foreign capitalist and the foreign workman, in order that luxury might be clothed at a farthing or so a yard less! That is free trade!

"In the early days of free trade there were no steamers, no means of rapid transit. We could not be inundated with foreign goods—even corn came in slowly. We were masters of the world in regard to manufactures. To-day we are not; to-day we have free trade in all its simplicity, and the result is disaster, the bankruptcy of the manufacturer, the ruin of the farmer, and the destruction of independent and profitable labor."

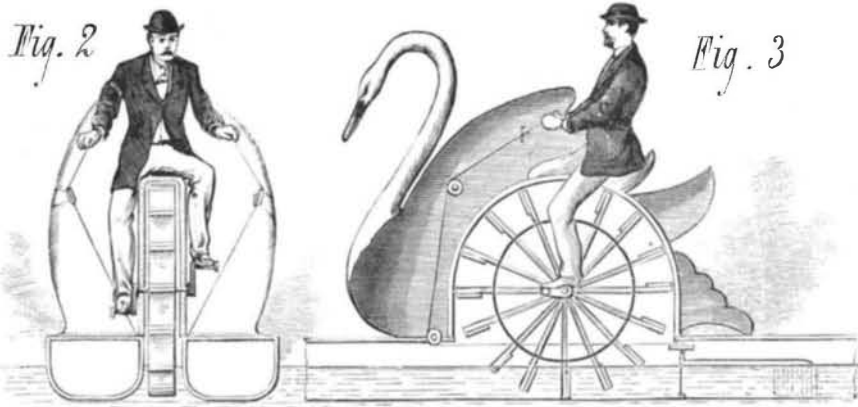
Nevada Monumental Granite.

The beautiful stone contributed by the State of Nevada to the Washington Monument has arrived in that city, and is described by the *Republican* as an object of great interest. It is a pure specimen of native granite, and is elaborately inscribed. The letters are of solid silver, and about as thick as a silver dollar, some six inches in height, and of proportionate width. They are so neatly fitted into the solid granite that the joint is almost invisible. Above the word "Nevada" is deeply cut in the granite the motto of the State, "All for Our Country," and below the date, 1881. The figures of the date are plated with gold. The granite composing it is the hardest ever seen. That part which is polished is almost blue in color, while the remainder presents a somewhat gray appearance. It is the most expensive stone contributed by any State so far.

The Survey of the Northwest.

Mention has been made in this paper of the projected scientific survey of the country tributary to the Northern Pacific Railway and the Oregon and Railway Navigation Company's lines, under Professor Raphael Pumpelly. The *Evening Post* announces that the work, which will be organized for a term of years, contemplates mapping the country

"on a published scale of four miles to the inch," in order to show the geological structure, the distribution of minerals, of the different varieties of soils, of plants and animals, and the climatic conditions. For the thoroughness and high scientific quality of it the director's name is a guaranty, but he has also associated with him a number of trained men from the United States Geological Survey, including Mr. Wilson, the able topographer of the Fortieth Parallel Survey. The classification of the lands of the railroad companies according to their fertility and their mineral and timber resources will, of course, furnish a rational guide to the extension of branches, and will have a wholesome effect in turning immigration into remunerative channels. The bulletin which the survey contemplates publishing will thus be eagerly consulted. Meantime, the Signal Service will welcome the new

**SECTIONAL VIEWS OF VELOCIPEDE BOAT.**

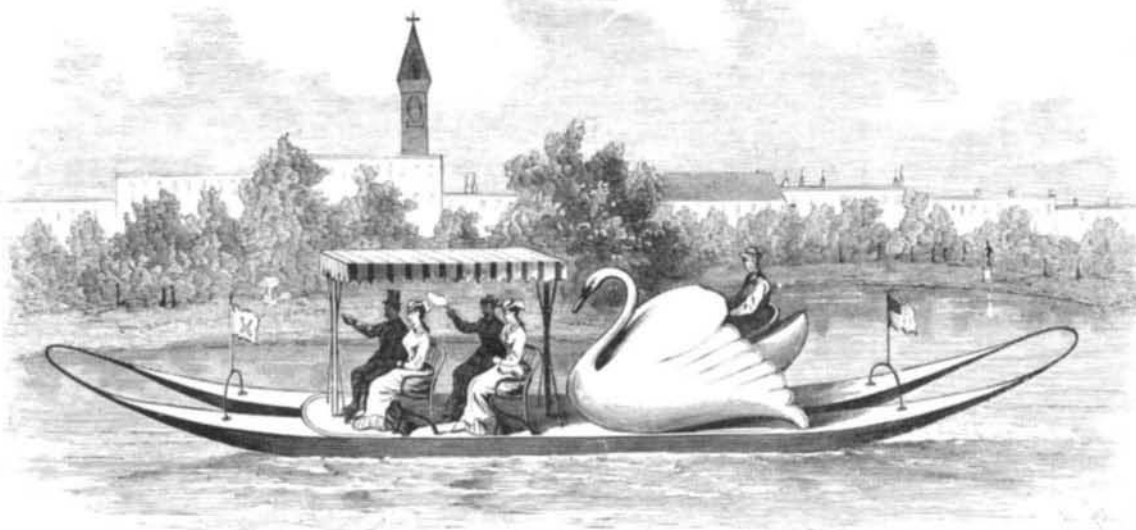
meteorological stations to be established in the pre-eminently weather-breeding sections of the continent. In every way the country at large will profit by this nominally private enterprise, which anticipates the national exploration of the great northwest territory.

VELOCIPEDE BOAT IN THE PUBLIC GARDEN, BOSTON.

We give engravings of a velocipede boat of novel design in daily use in the Public Garden, Boston, Mass. The boat is made after plans by Captain Thompson, and is not only an ornament to the lake, but is one of the easiest and most comfortable of small craft.

The boat is double, the two hulls being connected together by curved bars at the bow and stern. The paddlewheel plies between the hulls, and is located abaft the middle of the boat. It is worked after the manner of a velocipede wheel, and is covered by a metallic sheathing, which in turn is covered by a beautifully modeled swan in hammered copper.

The man working the wheel sits between the wings of the swan, and controls the rudder by tiller ropes extending upward over pulleys inside the swan, as shown in Fig. 3. The hulls are of galvanized iron, and measure about twenty-five feet in length.

**Fig. 1.—VELOCIPEDE BOAT IN THE PUBLIC GARDEN, BOSTON.**

The boat does not attain a great speed, but it is free from rocking and tipping, and is a great favorite. A number of them are in use in Boston.

Another New Comet.

The Smithsonian Institution has received from the Astronomer Royal of Greenwich the announcement of the discovery, by Denning, on October 4, at 15 hours, of a bright comet in Leo, in 9 hours 22 minutes right ascension, 16° of north declination, with a daily motion of 30 minutes east.

This is the fifth new comet of this year, Encke's being an old acquaintance. All but comet A, 1881, are, we understand, still telescopically visible. Four of the six appeared in the constellation Auriga. It is quite unusual for so many of these erratic wanderers to be on view at once.

Some Practical Hints on Nickel Plating.

BY FR. HARTMANN.

Nickel plates and sheet nickel are now generally made by the manufacturers of nickel ware. These may be used in the production of a solution which is particularly well adapted for nickel plating. To this end the nickel is placed on a perforated board in a saturated solution of ammonium chloride (sal ammoniac), and the metal brought in connection with the positive pole of a strong battery. By the influence of the electric current the metal gradually becomes dissolved, and a double salt is formed (nickel ammonium chloride), which settles on the bottom of the vessel, while, at the same time, the metal is kept continually in contact with the ammonium chloride.

If the nickel has previously been weighed, the amount of the metal which has become dissolved can at any time be determined by weighing the as yet uncombined nickel. In order to nickelize with this solution, a plate of pure nickel is suspended in the fluid, and it is connected with the positive pole of the battery, while the metallic body which is to be coated, and which must, of course, be well cleaned, is connected, after it has been immersed, with the negative pole. The nickel is precipitated from the solution as a bright coat, whose thickness depends upon the length of time during which the current is acting upon it, and also upon the strength of the latter.

In order to operate directly with the nickel sulphate, it is necessary to have a salt entirely acid free, which may readily be prepared by adding a small quantity of sodium hydrate (caustic soda) to the solution of the commercial salt, after having first removed the copper in the manner which will presently be described. When the acid is neutralized, an apple-green precipitate of nickel hydrate is formed, which is boiled for some time and then filtered. The solution is now perfectly neutral.

To remove the copper from the nickel salt, the latter is first dissolved in water and acidulated by a few drops of sulphuric acid (commercial nickel sulphate is generally acid), then a current of hydrogen sulphide gas, which is prepared by pouring sulphuric acid over iron sulphide in a flask, is passed through the solution.

The copper and other metals which are likely to be present are thrown down in the form of a black precipitate. When the odor of the gas is distinctly recognized its passage is stopped, and the solution heated to expel the last traces of the hydrogen sulphide. It is then heated to boiling in a porcelain vessel with the addition of some metallic nickel. By this means the free acid is neutralized, and on evaporating to crystallization there remains a salt sufficiently pure for nickel plating.

The articles which are to be plated are suspended in the solution which we have just described, and they are connected with the positive pole. A nickel plate, which also dips into the liquid, is connected with the negative pole; and from time to time the liberated acid is neutralized by the addition of a slight quantity of ammonium hydrate. It is better still, for practical results, to spread a layer of nickel oxide over the bottom of the vessel in which the nickelizing is being carried on. This will dissolve in the free acid, and the solution will therefore remain neutral and of uniform strength.

The nickel oxide is prepared by completely saturating a solution of nickel sulphate with sodium hydrate (caustic soda), washing the precipitate, and then drying it. The nickel oxide thus formed is a heavy powder of an apple-green color, and may be either spread over the bottom of the vessel, or else it can be placed in a linen bag and suspended in the liquid. If a solution of nickel sulphate, acidified with sulphuric acid, is poured into a saturated solution of ammonium sulphate, crystals will separate out, consisting of the double salt of nickel ammonium sulphate. The crystals are washed with cold water, dissolved in hot water, and then the solution is completely neutralized with ammonium hydrate. It is then allowed to stand for several days at a temperature of 20° to 25°, until no more crystals separate out. It is also of importance that the liquid be maintained at this temperature during the nickelizing, for otherwise the nickel will not adhere firmly to the metal.

During the operation of plating a sheet of nickel, connected with the positive pole of the battery, is suspended in the solution. According as the nickel becomes separated from the solution the sheet dissolves, and thus the solution maintains its original strength. Plates of absolutely pure nickel are at present quite expensive, in consequence of the