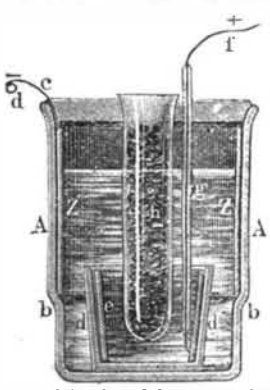
sonous organic gases from a kitchen yard, from a neglected cellar, or from some other source of bad air, which has entered the lungs and planted there the germs of the disease; or (2) either in the food or in the drink of the patient, these germs, originating in the same organic putrescence, have found their way to the stomach. In either case the blood is attacked; the subject may have been sufficiently robust and vigorous, or sufficiently unsusceptible to infection, to have avoided a serious or fatal illness; but in every instance the danger has been incurred, and, when incurred, the risk must be the same as in taking any other form of slow poison. This is not theory, but simply a well established fact, demonstrated by long, careful, and frequently repeated investigation. The precise character of typhoid infection and the exact manner of operation when introduced into the blood, are not known; but that it always originates in the way described, and that it may invariably be prevented by the use of proper sanitary precautions, is absolutely known.

This being the case, it lies perfectly within the province of every farmer (and if the farmer will not attend to such matters of his own accord, his wife has a way of urging him into it) to remove, while it is yet time, any source of infection to which his house may be liable. Vegetables in any considerable amount should not be kept in the house cellar, and at least once a week the floor of the cellar should be swept and every shred of waste vegetables removed. Even when this is done, the cellar should be ventilated by a window or other small opening toward the quarter least exposed to cold winds (and in summer on every side); the privy, if a privy is used, should be well away from the house, and especially far from the well, unless its contents are received in a tight box and entirely absorbed by dry earth or ashes, and even then frequently removed; the chamber slops of the house should never, under any circumstances, be thrown into the privy vault, nor into a porous cesspool, from which they can leach into the ground and through the ground for a long distance into the well, or into and around the foundation of the house. The same disposal of the liquid wastes of the kitchen is desirable, but not so absolutely important. It is, however, important that this should be led by an impermeable drain to a point well away from the house and from the well; swill and all manner of nondescript refuse material, such as is sloughed off by every household in the ordinary course of its living, should be removed at least daily from the near vicinity of the dwelling, and the vessels in which it accumulates should be frequently cleansed and aired; manure heaps should not be left to ferment and send off their exhalations at a point whence frequent winds waft them toward and into the dwelling, nor should the barnyard be allowed to drain (either over the surface or through a porous soil) toward the house or well. If all these precautions are taken, the well will be tolerably safe, and in most cases absolutely safe; but if there is any doubt on the point. then let no well water be drunk except after boiling; or the drinking water of the house may be taken entirely from a filtering cistern, of which the filtering bed is sufficient to hold back all organic matter.

If all these points are well attended to, and if the ordinary rules of cleanliness be observed in the household, the members of the family may be considered as safe against attacks of typhoid fever.

THE MEIDINGER BATTERY.

The Meidinger element is a modification of the Daniell battery; but it has no porous cell, and possesses greater durability and constancy of current. It consists, as shown in the engraving, of a glass vessel, A A, 8 inches high and 5 inches wide, in the bottom of which is placed a small glass vessel, *d d*, of half the dimensions of the larger glass, cemented in with rosin. A zinc disk, Z Z, which is supported upon a ledge of the outside vessel, surrounds the smaller glass. The inside wall of the smaller glass, *d d*, is covered by a sheet of copper, *e*, on the lower end of which an insulated copper wire, *g*, is riveted. The mouth of the vessel is closed by a wooden or tin plate having an opening in the center for the reception of a glass cylinder, *h*, 1¼ inches in diameter and 8 inches bigh, narrowing towards the lower end, which is rounded and in which a hole is made. This tube is sunk to the center of the small glass, *d d*. The entire vessel is filled up to the zinc disk, about 1½ inches below the upper brim, with a diluted solution of Epsom salts. The glass cylinder, *h*, in place of which a glass funnel can be used, is filled with crystals of sulphate of copper, forming a concentrated solution, which, being a heavier fluid, sinks down through the small hole in the glass tube, and fills the small glass, *d d*, to the center.



There is very little diffusion of the copper solution upwards, or out of the little glass vessel, *d d*, to the zinc disk, Z, even when the battery is not in operation; so that, after the lapse of several weeks, the zinc scarcely shows any signs of being affected by the copper. The battery is therefore much superior to the ordinary Daniell battery, which, when the circuit is open, produces a great diffusiou of the sulphate of copper through the porous cup.

The zinc is usually amalgamated on its inner side, enabling its impurities to be easily removed, which would otherwise form a hard crust. If the copper wire, *g f*, which is riveted to the copper sheet, *e*, is connected with a small strip of copper, *c k*, soldered to the zinc disk, we obtain a galvanic current having an electromotive force equal to that of a Daniell cell, and it remains constant as long as there is sulphate of copper in the glass tube, *h*; and the zinc, Z, is not dissolved. During the activity of the battery, in fact, the solution of sulphate of copper increases a little in quantity, in consequence of a diffusion which is caused by the overflowing (in the smaller glass, *d d*) of the heavier sulphate of zinc solution formed by the dissolution of zinc. By the action of the current, the greater part of the copper is deposited on the upper half of the copper plate. A trace of copper, however, appears upon the zinc, but frequently this is after several weeks' operation. The duration of the battery depends on the size of the glass vessel. A battery of the size described (according to Meidinger's statement) ought to be taken to pieces and the solution of Epsom salt and sulphate of zinc drawn off, and pure water put in it as soon as it has consumed 3 lbs. of sulphate of copper, which, however, may take a year.

The resistance of this cell considerably exceeds that of the Daniell battery with porous cells; but for a line battery, where the resistance in the wire is very considerable, this is of no special importance. Meidinger recommends, for main lines, cells 5 inches high and 3 inches wide; while the battery of the size depicted in our engraving is intended for local use and for line batteries of small resistance. As a local battery for the Morse telegraph, it is best to use six cells, two of which are connected with like poles, so that we have, practically, three elements with enlarged surface and conductivity.

Generally, in charging the Meidinger element, a solution of 1 part Epsom salts to 4 or 5 parts of water may be used. In proportion to the activity of the battery and the consumption of the sulphate of copper, fresh crystals of this salt should be added to the contents of the glass funnel. But when the surface of the fluid has sunk by evaporation, soft water only need be added to the glass funnel. An improvement has been obtained in this element by having the funnel-shaped sulphate of copper vessel entirely closed at the top. After the jar, *h*, has been charged with crystals of sulphate of copper, a solution of Epsom salts (sulphate of magnesia) is added thereto.

The Meidinger battery is valuable wherever long duration and a current of moderate but constant strength is required, and especially for operating the Morse telegraph, electrical clocks, hotel telegraphs, and electric bells. The chief condition for its successful use is that it shall not be shaken, as shaking causes a mixture of the fluids, and in this way destroys its action and the constancy of the current. Its faults consist in the liability that the tube, *h*, may be filled up with sulphate of copper (either from impurities of the salt or from precipitation of metallic copper) or crystals of sulphate of zinc, so that the action of the element ceases; and partly because the flow of the solution of sulphate of copper from the tube to the lower edge of the zinc cylinder rises, and then, at the least diffusion, the sulphate of copper attacks the zinc. When this happens, the sulphate of copper is decomposed by the zinc, a superfluous quantity of sulphate of zinc is formed in the fluid, and metallic copper is precipitated in the form of a brown, spongy powder upon the zinc cylinder. This battery is extensively used upon the Austrian telegraph lines.

Useful Recipes for the Shop, the Household, and the Farm.

Beef bones, boiled in water for some hours with rock salt and a little alum, yield a size which can be used in the preparation of cotton and silk goods.

The clatter and risk of glass in carriage windows can be prevented by placing, at the bottom of the casing, an arched piece of india rubber.

Unless the mouth is frequently and carefully cleansed, it becomes infested with vegetable and animal parasites. These cause decay of the teeth. Soap is the best material for preventing the development of the fungi and for neutralizing the acid. Precipitated chalk mixed with the soap assists the cleansing action.

The following practical hints on ballooning are published by Donaldson the aeronant, in a little paper edited by him and named the *Aerial*. The lifting strain of a balloon is principally on the net. If a balloon will stand inflation, it is safe in mid-air. In winter, the atmosphere is warmer one mile above the clouds than it is at the earth's surface. The weight of a balloon to carry one man, including net and basket, should not exceed 80 lbs. A cotton balloon will last for about sixty ascensions. A balloon thirty feet in diameter undergoes a strain of 1¼ lbs. to the square foot of surface. Gas, which at the earth fills the bag only half full, will, at an elevation of 3½ miles, expand so as to fill it completely. One thousand feet of coal gas will raise 38 lbs. Gas which gives a poor light is the best for aerostatics. Kites can be used to steer balloons by sending them up or lowering them into currents of air traveling in different directions from that in which the balloon is sailing.

To make green gold, melt together nineteen grains pure gold and five grains pure silver. The metal thus prepared has a beautiful green shade.

The following recipes for metals resembling gold are said to produce a metal which will so nearly approximate the genuine as almost to defy detection without a resort to thorough tests: Fuse, together with saltpeter, sal ammoniac, and powdered charcoal, 4 parts platinum, 2½ parts pure copper, 1 part pure zinc, 2 parts block tin, and 1½ parts pure lead. Another good recipe calls for two parts platinum, 1 part silver, and 3 parts copper.

Cement for sealing fruit cans is made of resin one pound, tallow one ounce.

DECISIONS OF THE COURTS.

United States Circuit Court---District of New Jersey.

PATENT HARNESS TRIMMING.—WILLIAM M. WELLING *vs.* THE RUBBER-COATED HARNESS-TRIMMING COMPANY, ANDREW ALBRIGHT, AND LUTHER C. VOORHEIS

[In equity.—Before Nixon, J.—Decided May, 1874.]

NIXON, J.:

This is a suit for an alleged infringement of letters patent No. 37,941, and bearing date March 17, 1863, granted to the complainant for "a new and useful improvement in rings for martingales;" and the questions in issue are determined by the construction and scope to be given to the specification and claim of said patent.

The schedule annexed is dated April 8, 1862, and the complainant therein states his invention as follows:

"In letters patent granted to me August 4, 1857, a composition and mode of making factitious ivory is set forth, and out of said materials I have manufactured billiard balls, rings of various kinds, etc. My present invention does not relate to any particular composition, as that in the aforesaid patent, or any similar compound, may be employed.

The nature of my said invention consists in the employment of a metallic ring within a ring formed of artificial ivory or similar materials, for giving strength to the same, thereby producing a new article of manufacture, and one that is stronger than an ivory ring, and possesses all the beauty of appearance, and can be afforded at a very much less cost. Ivory rings—particularly such as used for martingales—require to be made out of very solid ivory in order to be sufficiently strong, and hence are quite costly.

In order to make my improved rings, I take a ring of metal such as shown at A; or said ring may be formed by punching out a washer from a sheet of metal or in any other suitable way. I take the amount of ivory composition and, by dies or by hand, cause the said composition to completely envelope the said ring with as much uniformity as possible, and, to give the exterior finish to the same, press and solidify the mass of composition around the ring by means of dies, and in so doing, any plain or more or less ornamental shape may be given to the said ring or the surface thereof. My ring is thus made of the desired ornamental appearance, while great strength is attained at very little cost.

What I claim, and desire to secure by letters patent, is the ring for martingales, etc., manufactured as set forth, with a metal ring enveloped in composition, as and for the purposes specified."

It is insisted by the defendants that, if the patent is valid at all, it must be limited to a "martingale ring intended to imitate ivory, and made by covering a metallic ring with artificial ivory, such as is described in complainant's patent of 1857, or some similar compound." Bearing in mind the established American rule that patents are to be construed liberally, and are not to be subjected to a rigid interpretation, I think that the construction is too narrow, and does not give to the patentee all that he is entitled to under the specifications and claims of his patent. It is quite clear, indeed, that factitious ivory was the composition uppermost in his thoughts. Having the partiality of a parent for his offspring, he naturally imagined that no superior compound could be formed or used. It may be conceded that the full extent of his invention had not dawned upon him. Men often build better than they know; but where the fair interpretation of the words employed to describe an invention or discovery includes matters not in the mind of the patentee at the time, he is as fully authorized to claim the unlooked-for as he is the anticipated results.

I am of the opinion, on the whole case, that the claim of the complainant's patent, fairly construed, is not to be limited to the use of factitious ivory; that it is broad enough to include the composition of rubber or gutta percha, and that there should be a decree for the complainant according to the prayer of his bill.

[*Frederic H. Betts*, for complainant.
J. C. Clayton, for defendants.]

PATENT HARNESS TRIMMING.—WILLIAM M. WELLING *vs.* THE RUBBER-COATED HARNESS-TRIMMING COMPANY, ANDREW ALBRIGHT, AND L. C. VOORHEIS.

[In equity.—Before Nixon, J.—Decided February, 1875.]

NIXON, J.:

This is an application for an attachment against the defendants for violating an injunction issued by this court, June 12, 1874, restraining them from making, using, or vending to others to be used, any harness or carriage trimmings containing the invention of the plaintiff, and secured to him by letters patent, to wit, "a ring manufactured as set forth substantially," with "a metal ring enveloped in composition, as and for the purpose specified."

The injunction followed the decree of the court, sustaining the validity of the complainant's patent, No. 37,941, for "an improvement in rings for martingales:" and the question now suggested is the scope of the said patent.

In the course of the accounting before the master, it was insisted by the defendants that the patent of complainant referred only to the use of certain compositions in the manufacture of rings for martingales, and hence that the decree compelled them to account only for the manufacture of rings; whereas the complainant claimed that all the articles used in harness and carriage trimmings which have been treated by the process described in his letters patent, such as terrets, buckles, and hooks, should be included by the master.

I have examined the bill, answer, proofs, arguments of counsel, and the opinion heretofore given in the case, and this examination has confirmed the strong impression in my mind, when this application was made, that the complainant is asking that a wider scope be allowed to the claims of his patent than has yet been distinctly given to it by the court.

I do not mean to be understood as saying that it will not admit of such scope and meaning; but that the question has not been presented, and that the patent has not been considered in reference to such construction.

All that the complainant is permitted to claim, under the decisions of the court as it stands, is a specific article of manufacture, to wit:

A metal ring, coated with any plastic composition capable of being compressed and solidified by the use and action of dies, whereby a ring is produced with an exterior surface more durable and more highly polished than has before been obtained by different processes of manufacture and at greater cost.

Such a construction, obviously, relates to the product. The complainant's patent is held to be good for the product resulting from a new combination of old instrumentalities. His claim on this application is understood to be for the process, and that the invention includes that as well as the product. Doubtless both may be covered by one patent, as was held by Judge Grier, in this court, in the case of Goodyear *vs.* The Railroads, (2 Wall., p. 356;) but in such a case the description of the invention in the specification and claims should disclose that the inventor had both results in his mind.

But the grave doubt here is whether the specification and claim of the complainant's patent are broad and full enough to cover a new process as well as a new product.

It is a well settled principle that a patentee may so limit his claim as to deprive himself of the full benefit of his invention or discovery. It was to remedy such a difficulty or omission that the privilege of surrender and reissue was granted in the patent laws. Patentees often fail to realize any substantial advantage from some of the most useful inventions, owing to their too narrow claims, until such surrender, amendments, and reissue have been made.

The complainant is entitled to be protected only in the rights which the letters patent cover and secure to him. I incline to the opinion that the specification and claim of the patent under consideration will be found too limited in their scope to admit of the construction now claimed for them by the able counsel for the complainant; but without expressing any decided conviction on the subject, I shall, at this stage of the case, deny the application for an attachment, and direct the master to proceed with the accounting.

Under the reference already ordered he may take an account—

1. Of the rings coated and finished by the defendants, according to their methods as described in the proofs.

2. Of the terrets, buckles, and hooks, as claimed by the complainant.

He will make up the two accounts separately, so that the aggregate of each may be readily distinguished; and when his report is made, the parties will have the opportunity of obtaining the judgment of the court in this new, and as yet unconsidered, construction of the specification and claim of the patent, after their views are more fully presented, as they may be, on exception to the report.

[*F. H. Betts*, for complainant.
J. C. Clayton and *A. Q. Keasbey*, for defendants.]

NEW BOOKS AND PUBLICATIONS.

THE PHILADELPHIA LEDGER ALMANAC. G. W. Childs, Philadelphia, Pa.

At the commencement of the year 1870, Mr. Childs, publisher of the daily *Philadelphia Ledger*, issued an almanac which contained not only the calendar and a great deal of statistical information of a local interest, but also several pages of practical household recipes, and other information of general value. One hundred thousand copies were printed and presented to the subscribers of the *Ledger* in that year. The first issue proving so acceptable as a book of reference, Mr. Childs was induced to continue the publication and gratuitous distribution among the *Ledger's* patrons, and each successive year has the work improved. By the favor of the publisher, we have before us, neatly bound, six years' numbers of his almanac, which make a handsome volume of 350 pages of very valuable information, on both local and general subjects, not attainable in so complete a form in any other work.

LEFFEL'S MILLING AND MECHANICAL NEWS. Fifty cents per annum. James Leffel & Co., Springfield, Ohio.

To persons interested in milling machinery or water power, this paper issued each month, possesses especial interest. The editor is an admirer of the SCIENTIFIC AMERICAN, and in his April number promulgates the fact as follows: "It is a matter of just congratulation to Americans that, whatever may be the assumed superiority of European standards in art and literature, this country has at least one scientific journal which so signally eclipses any foreign publication of the kind that a comparison can scarcely be made. We refer, of course, to the SCIENTIFIC AMERICAN, published by Messrs. Munn & Co. 37 Park Row, New York city. Besides being a recognized authority and inexhaustible medium of information in the whole domain of practical science, it is faultless in its appearance, and its illustrations are works of art. Its subscription price is $3.20 per annum, postage prepaid, and the immense circulation it has reached is a proof of the advancing intelligence of the American people."