Postal Card Ink.

With the numerous useful and useless little inventions for which our country is noted, it is surprising that no one has yet placed in the market any kind of invisible ink for postal cards. Although we do not believe that such ink would prove very useful, it would probably meet with considerable sale, partially from the novelty of the thing. Many kinds of magic ink have been known for years, but most of them possess some disadvantages. A writer in the *Deutsche Industrie Zeitung*, in discussing the subject, claims that postal card ink should possess the following properties: 1. The writing must, of course, be invisible at first. 2. It must be of such a nature as to be rendered visible quickly and easily by means in the possession of every one at all times. 3. There should not be several kinds of this ink in market, one of which is developed by light, another by heat, a third by common salt solution, etc., so that, on receiving a blank card, the receiver would be at a loss to know how to develop it. This writer then goes on to recommend the use of a solution of nitrate or chloride of cobalt, mixed with a little sugar or gum to make it flow easily from the pen. Such writing is made visible by moderate heat, even a burning match being sufficient. Dr. Böttger, in a note to this article, recommends the use of ferrocyanide of potassium, or yellow prussiate of potash, which is readily developed by the sulphates of copper and iron (blue or green vitriol), the former yielding brown, the latter blue, letters.

Dr. Böttger is an exceedingly ingenious chemist, and most of his suggestions are very practical, but we beg to differ with him this time. Very few persons, except chemists, may be supposed to have solutions of either blue or green vitriol always at hand; and even a chemist, unless notified to this effect beforehand, would not think to try the effect of these solutions until he had tried several other reagents. This could be remedied by writing on the back of the card with common black ink an ambiguous or nonsensical sentence containing the name of the developer to be employed. For chemists, a convenient ink would be a solution of some lead salt, which is developed by sulphuretted hydrogen.

For ordinary use the most convenient ink is an iron salt; the common tincture of iron of the drug store will answer, if diluted. This writing is scarcely perceptible when dry, but comes out a beautiful black on pouring over it some ordinary green or black tea: The tannin in the tea unites with the iron to form a black ink precisely like that used for ordinary correspondence.

Another ink, less convenient for the writer, but more convenient for the receiver, is to write on the card with thin starch paste. When perfectly dry, the card is flowed with a solution of iodine in very strong alcohol. This imparts a reddish color to the card, but does not develop the writing, owing to the absence of water. The receiver has only to dip the card in water, when the writing will appear in blue characters. We offer this as a suggestion to manufacturers of magic inks. Of course, the operation of flowing with tincture of iodine might be left for the person who receives it, provided he were furnished with a key to the developer required. In this case dilute alcohol, or a solution of iodide of potassium, could be employed as a solvent for the iodine.

Another method, more curious than useful, consists in writing on the card with a solution of paraffin in benzol. When the solvent has evaporated the paraffin is invisible, but becomes visible on being dusted with lampblack or powdered graphite, or smoking over a candle flame. H.

Antidote for Oidium on Grape Vines.

M. Chatot, a Frenchman, recommends common table salt as an antidote for oidium, or grape vine disease. He says that his vines and grapes were covered for some years with a fungus-like substance, and that last spring he sprinkled a handful of salt about the roots of each vine. The effect was marvellous, the vines grew luxuriantly, and bore an abundance of grapes entirely free from the fungus of oidium.

NEW BOOKS AND PUBLICATIONS.

THE ELEMENTS OF MACHINE DESIGN. An Introduction to the Principles which Determine the Arrangement and Proportions of the Parts of Machines, etc. By B. Cawthorne Unwin, Professor of Mechanical Engineering at the Royal Indian College of Civil Engineers. Price 3s. 6d. (84 cents gold). London, England: Longmans, Green & Co., Paternoster row.

The designing of machinery has hitherto been principally left to the draftsmen, and no attempt has been made until recently to reduce their different practices and methods to a science; and although it might be easy to form a collection of rules deduced from actual practice, no principles could be laid down on the authority of such empirical formulæ. To systematize the whole subject, and thus to simplify the practice and render it easy of acquisition by students, is the author's object, and he has succeeded in completing a work of the highest excellence. The chapters on materials and strength of materials, on riveted joints, and on shafting, are especially to be noticed for their terse and clear explanations; and throughout the book the mathematical expressions used need not deter any careful and painstaking student by their depth and abstruseness. The author has evidently put into this volume an amount of practical knowledge which must have taken many years to acquire.

THE MICROSCOPIST. A Manual of Microscopy. By J. H. Wythe, M.D. Third Edition. Illustrated. Price $4.50. Philadelphia, Pa.: Lindsay & Blakiston, Publishers. New York city: D. Van Nostrand, 27 Warren street.

Professor Wythe offers a practically new work, since he has retained nothing but the name and perhaps the general design of his earlier elections. The present book is in all respects creditable both to the author and the publishers; and we can cordially commend it to students of microscopy. It abounds in clear, practical suggestions; its descriptions of microscopic objects and their mode of preparation are exceedingly lucid; while an abundance of admirable illustrations is provided. Beginning with a description of the various forms of microscope, the author explains all the accessories, mechanical arrangements, etc., including the microspectroscope and the practice of micro-photography; chapters on the use of the instrument and how to prepare objects follow, and then the several applications of the instrument, as a means of investigation in the various sciences, are separately and fully considered.

THE LIFE HISTORY OF OUR PLANET. By William D. Gunning. Illustrated by Mary Gunning. Chicago, Ill.: W. B. Keen, Cooke & Co.

A popular and readable work on a subject which is calculated, better than any other we know of, to test an author's powers of discrimination. We can give Mr. Gunning credit for presenting his views in a new way, and can heartily commend the progressive manner in which he leads the reader from the simpler to the complex subjects. Besides, all the book has a timely value, because many recent discoveries—notably those of Professor Marsh and the deep sea expeditions—are explained in popular form, and are brought into their proper connection with the history of the world.

A PRACTICAL TREATISE ON HEAT. By Thomas Box. Price $5. New York city: E. & F. N. Spon, 446 Broome st.

The second edition of an excellent standard work. It takes account of all the recent advances in the science, embodies a large number of the tables which enter into the daily practice of mechanical engineers, and, in brief, is a handbook, a thorough knowledge of the contents of which would be invaluable to any one in a mechanical profession. We can commend it to the many correspondents who frequently ask us what books young engineers should study.

CELESTIAL DYNAMICS. By James W. Hanna. Price 30 cts.

The author, who says he knew nothing about astronomy a year ago, now undertakes to upset the science by affirming the non-revolution of planets about the sun.

FIRES IN THEATERS. By Eyre M. Shaw, R.E., Chief of the London Fire Brigade. Price 50 cents. New York city: E. & F. N. Spon, 446 Broome street.

A very sensible treatise on an important subject, by a writer of great knowledge and experience.

On page 359, volume XXVI., we described and illustrated Mr. C. Baillarge's new system of mensuration. We are in receipt of a "Key to Baillarge's Stereometrical Tableau," relating to the same subject. Published by C. Darveau, 82 Mountain Hill, Quebec, Canada.

"Cleaning and Scouring" is the title of a handy little book of recipes for laundresses and others. Published by E. & F. N. Spon, 446 Broome street, New York city. Price 20 cents.

DECISIONS OF THE COURTS.

Supreme Court of the United States.

LEATHER PATENT.—NATHAN C. RUSSELL, APPELLANT, *vs.* SAMUEL DODGE, SR., AND SAMUEL DODGE, JR.

[Appeal from the Circuit Court of the United States for the Northern District of New York.—Decided October Term, 1876.]

Where a useful result is produced in any art, manufacture, or composition of matter, by the use of certain means for which the inventor or discoverer obtains a patent, the means described must be the essential and absolutely necessary means, and not mere adjuncts, which may be used or abandoned at pleasure.

Where a reissued patent is granted upon a surrender of the original, for its alleged defective or insufficient specification, such specification cannot be substantially changed in the reissued patent, either by the addition of new matter or the omission of important particulars, so as to enlarge the scope of the invention as originally claimed. A defective specification can be rendered more definite and certain so as to embrace the claim made, or the claim can be so modified as to correspond with the specification; but, except under special circumstances, this is the extent to which the operation of the originalpatent can be changed by the reissue.

Where the patent was for a process of treating bark-tanned lamb or sheep skin by means of a compound, in which heated fat liquor was an essential ingredient, and a change was made in the original specification by eliminating the necessity of using the fat liquor in a heated condition, and making in the new specification its use in that condition a mere matter of convenience, and by inserting an independent claim for the use of fat liquor in the treatment of leather generally, the character and scope of the invention as originally claimed were held to be so enlarged as to constitute a different invention.

The action of the Commissioner of Patents in granting a reissue within the limits of his authority is not open to collateral impeachment, but his authority being limited to a reissue for the same invention, the two patents may be compared to determine the identity of the invention. If the reissued patent, when thus compared, appears on its face to be for a different invention, it is void, the Commissioner having exceeded his authority in issuing it.

The case of Klein *vs.* Russell, reported in the 19th of Wallace, stated and qualified.

Mr. Justice Field delivered the opinion of the court:

This is a suit for an infringement of a patent obtained by the complainant for an alleged new and useful improvement in the preparation of leather, with a prayer that the defendants be decreed to account for and pay to him the gains and profits derived by them from making, using, and vending the improvement, and be enjoined from further infringement. The patent bears date in February, 1870, and was issued upon a surrender and cancellation of a previous patent obtained by the complainant in August, 1869, upon the allegation that the original patent was inoperative and invalid by reason of an insufficient and defective specification of the improvement. The validity of the reissued patent is assailed on the ground that it describes a different invention from that claimed in the original patent, and for want of novelty in the invention. Other grounds of invalidity are also stated, but in the view we take of the case they will not require consideration.

In the schedule accompanying the patent, giving a description of the alleged invention and constituting a part of the instrument, the complainant declares that he has "invented a new and useful improvement in the preparation of leather;" that "the invention consists in a novel preparation of what is known as bark-tanned lamb or sheep skin," by which the article is rendered soft and free, and adapted, among other uses, for the manufacture of what are termed "dog-skin gloves;" and that "the principal feature of the invention consists in the employment of what is known among tanners and others as 'fat-liquor,' which is ordinarily obtained by scouring deer skin after tanning in oil," but which may be produced by the cutting of oil with a suitable alkali. The schedule then proceeds to state that in treating the leather with fat liquor "it is *desirable* to heat the liquor to or near the boiling point; and that it is *preferred* to use the same in connection with other ingredients," such as soda, common salt, and soap in specified quantities for each ten gallons of the heated liquor; and that "to effect the treatment" the skin should be well dipped in or saturated with the fat liquor or compound, of which fat liquor is the base. The schedule closes by a declaration that what the patentee claimed and desired to be secured by letters patent was:

1. The employment of fat liquor in the treatment of leather, substantially as specified.

2. The process, substantially as herein described, of treating bark-tanned lamb or sheep skin by means of a compound composed and applied essentially as specified.

It is clear from this statement that the patent is for the use of fat liquor in any condition, hot or cold, in the treatment of leather, and for a process of treating bark-tanned lamb or sheep skin by means of a compound in which fat liquor is the principal ingredient. The state of the liquor is not mentioned as essent al to the treatment, or to accomplish any of the results sought. It is only stated as a thing to be *desired* that the liquor should be heated, and that it would be *preferable* that other ingredients were mixed with the heated liquor to make the compound mentioned. In other words, the specification declares that by heating the liquor the effect desired will be more readily produced—that is, more speedily or with less trouble and expense; not that the heating is in any respect essential to the treatment. Where an useful result is produced in any art, manufacture, or composition of matter by the use of certain means for which the inventor or discoverer obtains a patent, it is, as justly observed by the presiding justice of the circuit court, too plain for argument that the means described must be the essential and absolutely necessary means, and not mere adjuncts which may be used or abandoned at pleasure.

The originalpatent was less extensive in its claim than the reissue. That patent was for a process of treating bark-tanned lamb or sheep skin by means of a compound, in which heated fat liquor was an essential ingredient. The specification was explicit in this particular, and left no doubt on the subject. The reissued patent covers the use of the fat liquor in any condition, hot or cold, and when used alone or in a compound with other ingredients, and thus has a more extended operation, bringing under it manufactures not originally contemplated by the patentee. Is such a reissue valid?

The statute of 1836 (2 Statutes at Large, 122), under which the reissue was granted, provided that whenever any patent was inoperative or invalid by reason of a defective or insufficient description or specification, or by reason of the patentee claiming as his own invention more than he had a right to claim as new, if the error arose from inadvertence, accident, or mistake, and without any fraudulent or deceptive intention, it should be lawful for the Commissioner, upon the surrender of such patent and the payment of a prescribed duty, to cause a new patent to be issued to the inventor for the *same invention*, for the residue of the period then unexpired, in accordance with the corrected description and specification.

According to these provisions a reissue could only be had where the original patent was inoperative or invalid, by reason of a defective or insufficient description or specification, or where the claim of the patentee exceeded his right, and then only in case the error committed had arisen from the causes stated. And as a reissue could only be granted for the same invention embraced by the original patent, the specification could not be substantially changed, either by the addition of new matter or the omission of important particulars, so as to enlarge the scope of the invention as originally claimed. A defective specification could be rendered more definite and certain so as to embrace the claim made, or the claim could be so modified as to correspond with the specification; but except under special circumstances, such as occurred in the case of *Lockwood & Morey* (8 Wall., 230), where the inventor was induced to limit his claim by the mistake of the Commissioner of Patents, this was the extent to which the operation of the original patent could be changed by the reissue. The object of the law was to enable patentees to remedy accidental mistakes, and the law was perverted when any other end was secured by the reissue.

Judged by that law, and the provisions of the act of 1870 on this subject are substantially the same, there can be no doubt of the invalidity of the reissue. The original patent was not inoperative nor invalid from any defective or insufficient specification. The description given of the process claimed was, as stated by the patentee, full, clear, and exact, and the claim covered the specification—the one corresponded with the other. The change made in the old specification by eliminating the necessity of using the fat liquor in a heated condition, and making in the new specification its use in that condition a mere matter of convenience, and the insertion of an independent claim for the use of fat liquor in the treatment of leather generally, operated to enlarge the character and scope of the invention. The evident object of the patentee in seeking a reissue was not to correct any defects in specification or claim, but to change both, and thus obtain, in fact, a patent for a different invention. This result the law, as we have seen, does not permit.

The decision of the Commissioner in granting the reissue is, it is true, so far conclusive as to preclude in the present suit for infringement any inquiry into its correctness outside of the patents themselves. His action in any case, within the limits of his authority, is not open to collateral impeachment. But that authority being limited to a reissue for the same invention as that embraced in the original patent, a reissue for anything more is necessarily inoperative and void. To determine the identity of the invention the two patents may be compared. Thus compared, the reissue here appears on its face to be for a different invention, and the Commissioner, therefore, exceeded his authority in issuing it. (Seymour *vs.* Osborne, 11 Wall., 544; Wicks *vs.* Stevens, 2 Wood's C. C. Reports, 312.)

In the case of Klein *vs.* Russell (19 Wall., 463), the question was not before the court whether the reissued patent was invalid because not for the same invention. The point was not made in that case in the court below, and for that reason, it was stated, the point could not be made here. It was to be presumed, said this court, until the contrary was made to appear, that the Commissioner did his duty correctly in granting the reissue. What was subsequently said of the character of the first claim, so far as it conflicts with the construction here given, does not meet our approval after the extended consideration the subject has since received.

But assuming that the reissue is not void for the reasons stated, the patent is still invalid for want of novelty in the alleged invention. The use of fat liquor in the treatment of bark-tanned skins was general with manufacturers for many years previous to the alleged invention. Testimony to this effect is given by numerous witnesses. It would subserve no useful purpose to state this testimony. It is set forth with ample fullness in the opinion of the circuit court. It is sufficient for us to say that it is entirely satisfactory to our minds.

The decree is affirmed.

United States Circuit Court—District of Connecticut.

BOLT PATENT.—WILLIAM J. CLARK *vs.* THE KENNEDY MANUFACTURING COMPANY AND EDWIN HILLS.

[*In Equity.—Before* SHIPMAN, J.—*Decided January* 1, 1877.]

The invention described in the original patent to Wm. J. Clark, February 2, 1864, consists in the manner in which he applied lateral compression to the manufacture of an angular neck, and in the mannerin which he permitted the shaping mechanism to become anvil ends, upon which the header could operate to form a head upon the bolt.

He did not discover that swaging round iron would form an angular neck, and that upsetting would form a head, and that both operations would form a bolt; but he did invent what was before unknown—the mechanical means by which swaging would form an angular neck from round iron, which mechanism could be used in connection with upsetting.

The thing invented and patented was not any mode of swaging combined with upsetting; but it was the employment of specified means, or their equivalents, for the accomplishment of a desired end.

A patentee cannot, by obtaining a reissue for a process, enlarge his right to a monopoly beyond the actual invention.

The claims for the process of forming the angular neck and protuberant head, as contained in the reissue, construed to be to the use substantially of the dies described in the specification, or their equivalents.

The patent covers dies constructed with the round and square portions of similar area, whereby the lateral swaging is effected before the header operates; and it is not infringed by the use of dies, the square portion of which is of greater area than the round, and the swaging and upsetting operations are simultaneously performed.

The claim in the reissued patent does not include any machine for making bolts from round iron, in which machine the two operations of forming the angular neck by dies which will swage, and forming the head by upsetting, are combined.

Claims should be so construed, if possible, as to embrace the invention actually made and described.

Bill dismissed.

[*Chas. E. Mitchell* and *Benj. F. Thurston* for plaintiff.
Chas. R. Ingersoll for defendants.]

United States Circuit Court—District of Massachusetts.

WATER WHEEL PATENT.—THE SWAIN TURBINE AND MANUFACTURING COMPANY *vs.* JAMES E. LADD.

[*In equity.—Before* SHEPLEY, *J.:—Decided January* 2, 1877.]

Claims which would be void as being functional should be so construed as to embrace the described means for effecting the result.

When changes of form involve functional differences, producing new or better results, they are patentable.

The claims in a reissued patent are to be construed so as not to embrace any invention broader in its scope than the invention described, or substantially suggested or indicated in the original.

ABSTRACT FROM THE OPINION OF THE COURT.

SHEPLEY, *J.*:

The reissued patent No. 28,314, dated November 19, 1872, has its first, second, third, and fifth claims so worded as in their broad and literal construction, without any limitation to the invention described in the specifications of the original and the reissued patent, to claim any form of "water wheel having an effective inward flow and discharge of part of the water, and an effective downward flow and discharge of part of the water simultaneously in one wheel, whereby the effective area of discharge is increased without increasing the diameter of the wheel" This is the exact language of the fifth claim, which would be void as a claim merely functional, unless this claim be construed as must also the first, second, and third claims, as including the described means of effecting the result. To uphold these claims they must not only be construed in connection with the described means in the reissue, but so construed as not to embrace any invention broader in its scope than the invention described, or substantially suggested or indicated, in the original. However meritorious and original the invention of Swain was (and of its originality and merit as an advance in the state of the art at the date of Swain's invention, the court does not entertain any doubt), nevertheless, its great merit and utility will not justify such broad claims in a reissue as shall effectually interpose a barrier in the path of subsequent inventors, and arrest the progress of invention. The broad language of these claims, liberally construed, eliminates from the combination in the reissue the downward and inward curvature of the crown which forms an essential functional element of the combination in the original. Such a literal construction of these claims, with the scope contended for by the complainants, would render the reissue void, according to the decisions in Wells *vs.* Gill, and many other cases decided by the Supreme Court of the United States, including Seymour *vs.* Osborne. In this connection the court can only repeat the language of the opinion in Forsyth *vs.* Clapp (1 Holmes).

The court will look beyond the mere form of words in the claim of a reissued patent into the specifications in both the original and reissued patents; and, even if on the face of the reissued patent it does not embrace anything not described or suggested in the original, nevertheless the court will ascertain whether there is any substantive invention adequate to support a claim ingeniously worded, not so much for the purpose of describing what the patentee really invented as of grasping within its terms some contrivance not within the knowledge or contemplation of the patentee, and for that reason, not by inadvertence or mistake, not embraced in the claims of the original patent.

Giving to these claims the construction which we have indicated, the word crown in the first three claims will refer to and include in the combination such a crown as is described in the original patent and represented in the drawings of the original and the reissue, and the fifth claim will be limited in its scope to water wheels possessing such elements as we have hereinbefore recited as the described essential component parts of the turbine wheel described in the specifications and drawings of the original patent. Giving this construction to the claims, the defendant does not infringe, and the bill must be dismissed.

[*J. S. Abbott* and *H. W. Boardman*, for complainants.
Browne & Holmes and *C. E. Mitchell*, for defendant.]