

**On Some Properties of Glass.**

Glass—whether in the form of the lens in the camera or the support for the film in the negative, or, indeed, in any of the many shapes in which it is applied to photographic use—is looked upon as a substance of such complete permanency and unalterability that it is possible we may be thought guilty of exaggeration when we say that to find a glass which has a just claim to this popular opinion is very far from being an easy matter. That form in which the unblemished character of glass appeals most to the photographer is, naturally, the negative plate, of which some hundreds of thousands must be used annually; and so much does the common idea rule manipulative practice that it is scarcely too much to say that it is more than likely that the poor, much abused bath is credited with many a vagary when it is perfectly innocent, and some chemical alteration of the glass is the source of the evil.

That glass is so liable to be altered a little reflection upon the difficulties found in plate cleaning will show; for when a case arises where stains, etc., unmistakably point to the glass as the cause, it is evident its surface has not been mechanically abraded or scratched, and the change, whatever it is, must be of a chemical origin, though, possibly, mechanical in its immediate effect upon the deposition of the silver forming the image. We purpose to give some idea of the character of the metamorphosis likely to be undergone by glass when exposed to the action of air or water. Forewarned is to be forearmed, and the deeper we are able to dip into the source of failures the more power do we obtain to prevent them.

Glass forms an interesting example of the fact that, whenever special excellence in a particular direction is to be attained, it must usually be at the expense of some quality or other. The various characteristics of glass—its hardness, lustre, permanency, insolubility, impressibility, etc.—prove this. It is in the main a silicate of soda or potash, or both, having combined with it other silicates, such as those of lime, alumina, baryta, etc. There is a glass made (silicate of soda) which is quite soluble in water—it has a beautiful sea green hue as generally found in commerce—and between it and the most insoluble varieties, containing silica and aluminium in large proportion, there are all varieties of solubility to be found. Silicates of lime or potash separately are acted upon by water and acids, but, fused together, they are insoluble. The greater the proportion of silica and alumina glass contains the more insoluble it becomes, and it is the manufacturer's province so to proportion the ingredients of his glass as to produce qualities most suitable for the object in view. In this country glass manufactured in Germany, France, and at home is to be purchased, and each has its peculiar characteristics. An extremely pale glass, almost colorless, was imported a number of years ago from Germany; but it gave way to the action of the atmosphere to a most remarkable extent, and we have for some years seen nothing of it.

It has frequently been stated that glass with an artificial surface—that is, one produced by polishing with abrasive powder—is less clean to work and more liable to stain than one with the natural surface first obtained after the sheet has cooled down. Though we believe it quite possible that more has been made of this difference of surface than the actual facts warrant, we can yet easily see why, apart from the supposed hardness of the hypothetical skin, artificially polished glass should be more readily acted upon by water or other chemicals. This surface being entirely given by a process of rubbing, or, as it were, minute scratching with a powder, it might be supposed that if it could be examined by a microscope it would be found rough like "obscured" glass, and thus offer a greater amount of surface to be acted upon.

The action of water upon glass is to decompose it, the potash and soda and a little silica being dissolved, and the greater the amount of alkali present the quicker is the decomposition brought about. The action of the atmosphere is of a similar nature, the moisture always present to a greater or less degree being the real active agent; the common result is to separate the soda and potash, and to leave the silica upon the surface sometimes in a manner that is only perceptible upon heating, when excessively minute flakes separate and leave a dull surface. It has been stated that glass buried deep in the earth has been, when dug up, so soft as to be cut with a knife.

The use of soda for cleaning old glass plates is often recommended, and in its way, and with proper precautions, it is very useful; but it is to be remembered that it dissolves the silica of the glass, acting with greater or less effect according to its strength and temperature. If this be borne in mind many troubles will be avoided, numerous cases of ineradicable stains having been traced to overlong soaking in alkaline solutions. If proof were needed of the solvent and injurious powers of small quantities of water, if continued for a sufficient length of time, it will be only necessary to breathe upon one half of a piece of patent plate glass, and, after immediately covering the film of condensed moisture by another plate to wrap up the two, place in a cold place for a twelve-month, and then examine. The moistened part will be roughened to such an extent as almost to take the mark of a blacklead pencil. We have seen packets of several gross of plates entirely ruined from this cause; glass plates brought up of a cold store room into a damp atmosphere had condensed the moisture of the air upon their surfaces, and the packer had packed them without wiping them, as, indeed, it was scarcely likely he would think of doing. They remained immersed for a considerable time, and when opened were found to have the surface visibly eaten into, not a glass re-

maining that was fit for use; and there cannot be a doubt that there must be large quantities of glass similarly injured, though, unfortunately, not visibly so, the mischief only being observed after taking the negative.

Again: if further proof were required of the solubility of glass—that is, its decomposition, which must result in disintegration and thus roughen the surface, if even microscopically, and render it liable to retain foreign matter—it would be found by boiling in a Bohemian glass vessel a weak alkaline solution in which litmus had been dissolved and acid afterwards added to produce a faint reddening. The result would be that sufficient alkali would be dissolved out of the glass to restore the blue color to the litmus. This same experiment can be proved in a homely way by adding a little red cabbage to distilled water, and boiling in such a vessel, when the distinct blue of the alkali would be given to the water.

We think we have advanced sufficient facts to show that glass is by no means the unalterable substance so commonly supposed. If it induce a little more care in the use of this necessary photographic adjunct our purpose will be served. —*British Journal of Photography.*

**Stove Blacking.**

We hope the following receipt for imparting to stoves a fine black polish, which will neither burn off nor give out an offensive smell, will prove acceptable to some of our readers: Lamp-black is mixed with water-glass (a solution of silicate of soda) to the consistency of syrup and applied with a brush as a thin and even coating, then left twenty-four hours to dry. Afterwards graphite, or black lead mixed with gum water, is applied, and a polish obtained by rubbing in the usual manner.

A CEMENT for meerschaum can be made of quicklime mixed to a thick cream with the white of an egg. This cement will also unite glass or china.

**Inventions Patented in England by Americans.**

June 15 to June 21, 1877, inclusive.

- BOOT SEWING MACHINE.—G. V. Sheffield *et al.*, Brooklyn, N. Y.
- CHECK REGISTER.—L. Von Hoven, New York city.
- CUTTING SHEET METAL.—G. A. Perkins, Philadelphia, Pa.
- INDICATOR FOR CAB FARES.—L. Von Hoven *et al.*, New York city.
- IRONING MACHINE.—T. S. Niles *et al.*, Troy, N. Y.
- METAL TUBES.—J. E. Folk, Brooklyn, N. Y.
- NEEDLES.—S. Peberdy *et al.*, Philadelphia, Pa.
- RIVETING MACHINES.—J. F. Allen, New York city.
- SCAFFOLD FRAME, ETC.—W. Murray, Vicksburg, M. ss.
- STEAM AND AIR ENGINE.—W. Mont Storm, New York city.
- TORPEDO PROTECTION.—J. T. Parlour, Brooklyn, N. Y.
- TOY.—C. W. Frost, Philadelphia, Pa.

**DECISIONS OF THE COURTS.**

**Supreme Court of the United States.**

OIL PATENT.—JOSHUA MERRILL, APPELLANT, *vs.* DAVID M. YEOMANS AND DANIEL J. GOSS, AS D. M. YEOMANS & GOSS.

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

A patent for a process is not infringed by the sale of an article similar to that produced.

The claims in a patent are to be considered as distinct from the description contained in the specification, and as representing what part of the matter described the patentee claims as his invention, and for which he asks protection.

Inventions or discoveries are usually improvements upon some existing article, process, or machine, and are only useful in connection with it. It is necessary, therefore, for an applicant to describe that upon which he engraves his invention, as well as the invention itself.

When the invention is of a new combination of old devices, it is necessary to describe with particularity all the old devices, and then the new mode of combining them.

While it is essential that the specification should describe such matters, both old and new, as are necessary to an understanding of the invention, the claim must contain a distinct and specific statement of what the applicant claims to be new and of his invention.

One who proposes to secure a monopoly of certain inventions at the expense of the public should set forth with clearness and precision the thing which no one but himself can use or enjoy without paying him for the privilege of doing so.

In a claim to "the above described new manufacture of the deodorized heavy hydrocarbon oils suitable for lubricating and other purposes, free from the characteristic odors of hydrocarbon oils, and having a slight smell like fatty oil, from hydrocarbon oils, by treating them substantially as is herebefore described," the word "manufacture" may be used to express the process or the product thereof, but when taken in connection with the words "by treating them substantially as is herebefore described," it renders the claim in effect to the new mode of manufacturing hydrocarbon oils by treating them as herebefore described.

The inventor of an article is entitled to protection therefor, however produced, and there is no reason why an applicant for a patent, if he had in his mind a claim for the article produced, should limit his claim by a description of the process.

The courts are inclined to give a patentee the benefit of a liberal construction of the patent, and when it appears that a valuable invention has really been made, to uphold that which was invented, and which comes within any fair interpretation of the claim; but when there are three inventions described, and but two claims made, each of which is valid and for the invention described therein, the court cannot give effect to the third invention, which the patentee has failed to claim.

The developed and improved condition of the patent law, and of the principles which govern the exclusive rights conferred by it, leaves no excuse for ambiguous language or vague descriptions. The public should not be deprived of rights supposed to belong to it without being told what it is that limits these rights.

The interests of the public demand that the claims in a patent should clearly and distinctly define and limit the actual inventor, claimed by and secured to the patentee.

Mr. Justice MILLER delivered the opinion of the court:

The appellant in this case, who was complainant in the Circuit Court, obtained a patent, in May, 1869, for a new and useful invention, which relates to the heavy hydrocarbon oils, and he sued the appellees, who were defendants in that court, for an infringement of his patent.

The defendants were dealers in oils and not manufacturers of them. If the appellant's patent was for a new oil, the product of a mode of treating the oils of that character which he describes in his application, the defendants may be liable, for they bought and sold, without license or other authority from him, an oil which is proved to be almost if not quite identical with the one which he produced. If, however, appellant's patent is only for the mode of treating these oils invented and described by him—no other words, for his new process of making this new article of hydrocarbon oil—then it is clear the defendants have not infringed the patent, because they never used that process, or any other, for they manufactured none of the oils which they bought and sold.

The counsel for appellant here maintain that his patent is for the new article, and is not for the process, though he describes it fully, by which that article is produced. The appellees insist with equal earnestness that the patent is exclusively for the process by which the new oil is made.

The issue thus presented must be decided solely upon a correct construction of the plaintiff's patent, and the accompanying specifications, in which, as required by the act of Congress, he makes the statement of his invention.

No such question could have arisen if appellant had used language which clearly and distinctly points out what it is that he claims in his invention.

We use the word claim as distinct from description. It must be considered that the appellant's specification describes with minuteness and pre-

cision both the instrumentality and the process by which he makes the oil in question. And in regard to a part of the apparatus which he uses he makes a distinct claim for its invention, and that is not in dispute here. He also describes with fullness and accuracy the process of distillation by which he produces this oil. He gives the temper ture to be used, the mode of heating, the degree of rapidity or delay to be used in distilling the introduction, and the advantage of that introduction, of superheated steam into contact with the oils to be distilled during the process.

He also describes, though in short terms, the article produced, the main feature of which he declares to be its freedom from the offensive odor which, before his invention, seemed to be an inseparable quality of those oils; and he mentions some of the more important uses to which this deodorized oil is applicable in the arts.

It is fairly to be inferred from this statement that if all which is described as new in these specifications is really so, the inventor has a right to a patent for three inventions:

1. For a modification or improvement in the distilling apparatus.
2. For a new process or mode of distilling heavy hydrocarbon oils, by which they are deprived of their offensive odors.
3. For the product of this new process of distillation, namely, the deodorized heavy hydrocarbon oils fitted for use in the arts.

When a man supposes he has made an invention, or discovery useful in the arts, and therefore the proper subject of a patent, it is nine times out of ten an improvement on some existing article, process, or machine, and is only useful in connection with it. It is necessary, therefore, for him in his application to the Patent Office to describe that upon which he engraves his invention, as well as the invention itself, and in cases where the invention is a new combination of old devices he is bound to describe with particularity all these old devices, and then the new mode of combining them, for which he desires a patent. It thus occurs that in every application for a patent the descriptive part is necessarily largely occupied with what is not new, in order to an understanding of what is new.

The act of Congress, therefore, very wisely requires of the applicant a distinct and specific statement of what he claims to be new and to be his invention. In practice, this allegation of the distinct matters for which he claims a patent comes at the close of the schedule or specification, and is often accompanied by a disclaimer of any title to certain matters before described, in order to prevent conflicts with pre-existing patents.

This distinct and formal claim is, therefore, of primary importance in the effort to ascertain precisely what it is that is patented to the appellant in this case.

In this part of his application he makes two separate claims, the second of which relates to a modification of the distilling apparatus, and is not in dispute here. Turning our attention to the first claim, we are compelled to say that the language is far from possessing that precision and clearness of statement with which one who proposes to secure a monopoly at the expense of the public ought to describe the thing which no one but himself can use or enjoy without paying him for the privilege of doing so. It is as follows:

I claim the above described new manufacture of the deodorized heavy hydrocarbon oils suitable for lubricating and other purposes, free from the characteristic odors of hydrocarbon oils, and having a slight smell like fatty oil, from hydrocarbon oils, by treating them substantially as is herebefore described.

The word manufacture in this sentence is one which is used with equal propriety to express the process of making an article, or the article so made. "The manufacture of hydrocarbon oils," means primarily the making of hydrocarbon oils. It may mean the thing made also. Are there other words in the sentence calculated to throw light on the meaning of this one?

I claim the above described new manufacture of hydrocarbon oils \* \* by treating them substantially as herebefore described.

It seems to us that the most natural meaning of these words is that—I claim this new mode of manufacturing hydrocarbon oils by treating them as herebefore described.

This is the meaning which would first suggest itself to the mind. If the product is meant, the "by treating them substantially as herebefore described" are useless. They are not only useless, but embarrassing, for by the well settled rules of construing all instruments some importance must be attached to them; and if they are to be regarded at all they must either refer to the process of making the oils for which the applicant is claiming a patent, or they are intended to limit his claim for a patent for the product to that product only, when produced by treating the oils in the manner before described.

The counsel for appellant disclaim this latter construction, and allege that the patent covers the oil described, by whatever mode it may be produced. It is necessary to insist on this view, because it is made to appear in the case that the oils sold by defendants were produced by a process very different from that described by appellant.

We can see no reason why the applicant for the patent, if he had in his mind a claim for the article produced, should have intended so to limit his claim. If the article was the discovery which he sought the exclusive right to make, use, and sell, he was entitled to that monopoly, however produced.

If, however, he had in his own mind only a claim for the process of manufacture by which the article was made, then his reference to the mode of treating the oils from which it came was evidently proper and intelligible.

But the language in the specifications aids us in construing the claim. In the sentence next preceding this claim he says:

It will also be evident to those skilled in the art that my invention will be used, if the above mentioned process be worked, to produce the deodorized heavy oils above described from distilled hydrocarbon oils, etc.

It is very clear that what he here calls his invention is a thing which produces the deodorized oils, and not the oils itself. So, again, he says:

From the above it will be obvious that my invention consists in producing heavy hydrocarbon oils suitable for lubricating and other purposes, and free from the characteristic odor, by distilling from them the volatile matter from which objectionable odors arise.

Again, he says: In carrying on my new manufacture of deodorizing heavy oils with this apparatus, I place the oil to be deodorized in the still and heat it by the fire beneath to the required temperature to commence the operation, the steam being shut off from the coil, and the outlet cock being opened to admit of the expulsion of any water from within the coil.

Here the word "manufacture" is used in the sense of the word "process," a word which could be substituted for it without a shade of change in the meaning. As it can here mean nothing else but process, we have a definition of the meaning to be attached to it in other parts of the same paper, if that meaning were otherwise doubtful.

But apart from these verbal criticisms, all of which are just, and tend strongly to show what was the invention claimed by appellant, it is impossible to read the four printed pages of specifications in which appellant minutely describes his invention without observing that they are almost wholly directed to the apparatus, the mode of using it, and the peculiar process of distillation, by which the more volatile parts of the heavy oils, which contain the offensive odors, are separated from the main body of the oil, pass over in that process, and leave the remainder free from this great drawback in its use in the arts. Why should this be so if the applicant for the patent was only looking to the products as his invention the deodorized heavy hydrocarbon oils? If the oil alone was to be patented, by whatever process made, this elaborate description of one particular process was unnecessary.

A strong appeal is made by counsel to give the appellant the benefit of a liberal construction in support of the patent. Cases are cited in which this court has held that rather than defeat a patent where it appears that a valuable invention has really been made, this court, giving full effect to all that is found in the application on which the Patent Office acted, will uphold that which was really invented, and which comes within any fair interpretation of the patentee's assertion or claim.

We are not disposed to depart from this rule in the present case. There is no question here but that the patent is good for the second claim, for the superheating coil, with its steam pipe, etc. And we are all of opinion that it is good for the process of distillation described in the specifications, by which the heavy hydrocarbon oils are deodorized. It is, therefore, a valid patent for two important matters well set forth and described. If the patentee is also entitled to a patent for the product of this distillation, and has failed, as we think he has, to obtain it, the law affords him a remedy by a surrender and reissue. When this is done the world will have fair notice of what the claims—of what his patent covers, and must govern themselves accordingly.

The growth of the patent system in the last quarter of a century in this country has reached a stage in its progress where the variety and magnitude of the interests involved require accuracy, precision, and care in the preparation of all the papers on which the patent is founded. It is no longer a scarcely recognized principle struggling for a foothold, but it is an organized system with well settled rules, supporting itself at once by its utility, and by the wealth which it creates and commands. The developed and improved condition of the patent law, and of the principles which govern the exclusive rights conferred by it, leave no excuse for ambiguous language or vague descriptions. The public should not be deprived of rights supposed to belong to it without being clearly told what it is that limits these rights. The genius of the inventor constantly making improvements in existing patents, a process which gives to the patent system its greatest value, should not be restrained by vague and indefinite descriptions of claims in existing patents from the salutary and necessary right of improving on that which has already been invented. It seems to us that nothing can be more just and fair, both to the patentee and to the public, than that the former should understand and correctly describe just what he has invented, and for what he claims a patent.

In consistency with these views, we are of opinion that the appellant in this case has described and claimed a patent for the process of deodorizing the heavy hydrocarbon oils, and that he has not claimed as his invention the product of that process.

The judgment of the Circuit Court is affirmed.

Mr. Justice Clifford dissenting.

I dissent from the opinion and judgment in this case upon the ground that the invention, when the claim is properly construed, is an invention of the described new manufacture, and not merely for the process as decided by a majority of the court.