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  Talbot (William Henry Fox)
- **pour – for :**
  Photographic Pictures. — Improvements in Obtaining Pictures, or Representations of Objects.

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Photographic Pictures.

TALBOT'S SPECIFICATION AND DISCLAIMER.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, William Henry Fox Talbot, of Lacock Abbey, in the County of Wilts, Esquire, send greeting.

WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Eighth day of February, in the fourth year of Her reign, did, for Herself, Her heirs and successors, give and grant, unto me, the said William Henry Fox Talbot, Her especial licence, full power, sole privilege and authority, that I, the said William Henry Fox Talbot, my exors, admors, and assigns, or such others as I, the said William Henry Fox Talbot, my exors, admors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, my Invention of "Improvements in Obtaining Pictures, or Representations of Objects;" in which said Letters Patent is contained a proviso, that I, the said William Henry Fox Talbot, shall cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, to be inrolled in Her said Majesty's High Court of Chancery, within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

NOW KNOW YE, that in compliance with the said proviso, I, the said William Henry Fox Talbot, do hereby declare the nature of my said Invention,

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and the manner in which the same is to be performed, are fully described and ascertained in and by the following statement thereof (that is to say) :—

The first part of my Invention is a method of making paper extremely sensitive to the rays of light. For this purpose I select the best writing paper, having a smooth surface and a close and even texture.

First Part of the Preparation of the Paper.—I dissolve one hundred grains of crystallised nitrate of silver in six ounces of distilled water, I wash one side of the paper with this solution with a soft camel hair brusb, and place a mark upon that side by which to know it again. I dry the paper cautiously at a distant fire, or else I leave it to dry spontaneously in a dark place. Next, I dip the paper in a solution of iodide of potassium, containing five hundred grains of that salt dissolved in one pint of water, I leave the paper a minute or two in this solution, I then take it out and dip it in water, I then dry it lightly with blotting paper and finisb drying it at a fire ; or else I leave it to dry spontaneously ; all this process is best done in the evening by candle light. The paper thus far prepared may be called, for the sake of distinction, "iodized paper." This iodized paper is scarcely sensitive to light, but, nevertheless, it sbould be kept in a portfolio or some dark place till wanted for use ; it does not spoil by keeping any length of time provided it is kept in a portfolio, and not exposed to the light.

Second Part of the Preparation of the Paper.—This, second part is best deferred until the paper is wanted for use ; when that time is arrived, I take a sbeet of the iodized paper, and wash it with a liquid prepared in the following manner :—Dissolve one hundred grains of crystallised nitrate of silver in two ounces of distilled water, to this solution add one-sixth of its volume of strong acetic acid ; let this mixture be called A. Dissolve crystallized gallic acid in distilled water as much as it will dissolve (which is a very small quantity) ; let this solution be called B. When you wish to prepare a sheet of paper for use, mix together the liquids A and B in equal volumes. This mixture I shall call by the name of gallo-nitrate of silver. Let no more be mixed than is intended to be used at one time, because the mixture will not keep good for a long period. Then take a sheet of iodized paper and wash it over with this gallo-nitrate of silver with a soft camel hair brush, taking care to wash it on the the side which has been previously marked. The operation should be performed by candle light. Let the paper rest half a minute, and then dip it into water, then dry it lightly with blotting paper, and lastly, dry it cautiously at a fire, holding it a considerable distance therefrom. When dry the paper is fit for use, but it is advisable to use it within a few hours after its preparation.

(Note, that if it is used immediately the last drying may be dispensed with,

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and the paper may be used moist), (Note 2nd, instead of using a solution of gallic acid for the liquid B, the tincture of galls diluted with water may be used, but it is not so advisable.

Use of the Paper.—The paper thus prepared, and which I name "calotype paper," is placed in a camera obscura, so as to receive the image formed in the focus of the lens, of course the paper must be screened or defended from the light during the time it is being put into the camera. When the camera is properly pointed at the object, this screen is withdrawn, or a pair of internal folding doors are opened, so as to expose the paper for the reception of the image. If the object is very bright, or the time employed is sufficiently long, a sensible image is perceived upon the paper when it is withdrawn from the camera. But when the time is short, or the objects dim, no image whatever is visible upon the paper, which appears entirely blank. Nevertheless, it is impressed with an invisible image; and I have discovered the means of causing the image to become visible. This is perfomed as follows :—I take some gallo-nitrate of silver, prepared in the manner before directed, and with this liquid I wash the paper all over with a soft camel hair brush, I then hold it before a gentle fire, and in short time (varying from a few seconds to a minute or two), the image begins to appear upon the paper. Those parts of the paper upon which light has acted the most strongly become brown or black, while the parts on which light has not acted remain white. The image continues to strengthen and grow more and more visible during some time. When it appears strong enough, the operation should be terminated and the picture fixed.

The Fixing Process.—In order to fix the picture thus obtained, I first dip it into water, I then partly dry it with blotting paper, and then wash it with a solution of bromide of potassium, containing one hundred grains of that salt dissolved in eight or ten ounces of water. The picture is then washed with water, and then finally dried. Instead of bromide of potassium, a strong solution of common salt may be used, but it is less advisable. The picture thus obtained will have its lights and shades reversed with respect to the natural objects; videlicet, the lights of the objects are represented by shades, and vice versâ. But it is easy from this picture to obtain another, which shall be conformable to nature; videlicet, in which the lights shall be represented by lights, and the shades by shades. It is only necessary for this purpose to take a second sbeet of sensitive calotype paper, and place it in close contact with the first, upon which the picture has been formed. A board is put beneath them and a sheet of glass above, and the whole is pressed into close contact by screws. Being then placed in sunshine, or daylight, for a short time, an image

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or copy is formed upon the second sheet of paper. This image or copy is often invisible at first, but the image may be made to appear in the same way that has already be stated. But, I do not recommend that the copy should be taken on calotype paper, on the contrary, I would advise that it should be taken on common photographic paper. This paper is made by washing good writing paper first with a weak solution of common salt, and next with a solution of nitrate of silver, since it is well known, having been freely communicated to the public by myself, in the year One thousand eight hundred and thirty-nine, and that it forms no part of the present Invention, I need not describe it here more particularly ; although it takes a much longer time to obtain a copy upon this paper than upon calotype paper, yet the tints of the copy are generally more harmonious and agreeable. On whatever paper the copy is taken, it should be fixed in the way already described. After a calotype picture has furnished a good many copies, it sometimes grows faint, and the subsequent copies are inferior. This may be prevented by means of a process which revives the strength of the calotppe pictures. In order to this, it is only necessary to wash them by candle light with gallo-nitrate of silver, and then warm them. This causes all the shades of the picture to darken considerably, while the white parts are unaffected. After this the picture is, of course, to be fixed a second time. The picture will then yield a second series of copies, and a great number of them may frequently be made.

(Note.—In the same way in which I have just explained that a faded calotype picture may be revived and restored, it is possible to strengthen and revive photographs which have been made on other descriptions of sensitive photographic paper ; but these are inferior in beauty, and, moreover, the result is less to be depended upon ; I therefore do not recommend them.

The next part of my Invention consists in a mode of obtaining positive photographic pictures, that is to say, photographs ,in which the lights of the object are represented by lights, and the shades by shades. I have already described how this may be done by a double process ; but I shall now describe the means of doing it by a single process. I take a sheet of sensitive calotype paper, and expose it to daylight until I perceive a slight but visible discoloration or browning of its surface. This generally occurs in a few seconds. I then dip the paper into a solution of iodide of potassium, of the same strength as before, videlicet, five hundred grains to one pint of water. This immersion apparently removes the visible impression caused by the light (nevertheless, it does not really remove it, for if the paper were to now be washed with gallo-nitrate of silver it would speedily blacken all over). The paper when taken out of the iodide of potassium is dipped in water, and then

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lightly dried with blotting paper, it is then placed in the focus of a camera obscura which is pointed at an object ; after five or ten minutes the paper is withdrawn and washed with gallo-nitrate of silver, and warmed as before directed ; an image will then appear of a positive kind, namely, representing the lights of the object by lights, and the shades by shades. Engravings may be very well copied in the same way, and positiye copies or them obtained at once (reversed, however, from right to left). For this purpose a sheet of calotype paper is taken and held in daylight to darken it as before mentioned but for the present purpose it should be more darkened than if it were intended to be used in the camera obscura. The rest of the process is the same. The engraving and the sensitive paper should be pressed into close contact with screws, or otherwise, and placed in the sunshine, which generally effects the copy in a minute or two ; this copy, if it is not sufficiently distinct, must be rendered visible, or strengthened with the gallo-nitrate or silver, as before described.

I am aware that the use of iodide of potassium for obtaining positive photographs has been recommended by others, and I do not claim it here by itself as a new Invention, but only when used in conjunction with the gallo-nitrate of silver, or when the pictures obtained are rendered visible or strengthened subsequently to their first formation. In order to take portraits from the life, I prefer to use for the object glass of the camera a lens whose focal length is only three or four times greater than the diameter of the aperture. The person whose portrait is to be taken should be so placed that the head may be be as steady as possible, and the camera being then pointed at it, an image is received on the sensitive calotype paper. I prefer to conduct the process in the open air, under a serene sky, but without sunshine ; the image is generally obtained in half a minute or a minute. If sunshine is employed, a sheet of blue glass should be used as a screen to defend the eyes from too much glare, because this glass does not materially weaken the power of the chemical rays to affect the paper. The portrait thus obtained on the calotype paper is a negative one, and from this a positive copy may be obtained in the way already described.

I claim, first, the employing gallic acid or tincture of galls, in conjunction with a solution of silver, to render paper which has received a previous preparation more sensitive to the action of light.

Secondly, the making visible pbotographic images upon paper, and the strengthening such images when already faintly or imperfectly visible by washing them with liquids which act upon those parts of the paper which have been previously acted upon by light.

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Thirdly, the obtaining portraits from the life by photographic means upon paper.

Fourthly, the employing bromide of potassium, or some other soluble bromide, for fixing the images obtained.

The next part of my Invention is a method of obtaining photogenic images upon copper. For this purpose I take a plate of polished copper, and expose it to the vapour of iodine or bromine, or of these two substances united, or of either of them, in union with chlorine; or else I dip the plate of copper into a solution of some of the above-mentioned substances in alcohol, ether, or another convenient solvent. By this means the copper surface becomes sensitive to light; a photogenic image is then to be formed upon it in the usual manner. The plate is then to be exposed to the vapour of sulphuretted hydrogen, or of one of the liquid hydro-sulphurets. This vapour produces various colors upon the surface of the copper, but it acts differently or produces a different color on those parts of the surface which have been exposed to light, and on those which have not been so exposed, consequently a colored photogenic image is obtained, and as this image is not destroyed by a subsequent exposure to light, no further fixing process is requisite. Instead of the vapour of sulphuretted hydrogen, other vapours or liquid solutions which color the surface of copper (as, for instance, iodine, bromine, and chlorine) may be employed, but with less advantage.

With respect, to this branch of my Invention, I claim the above-mentioned methods of rendering a surface of copper sensitive to light, and the method of rendering the photogenic image colored and permanent by subsequent exposure to vapours or liquids, which act differently on those parts of the surface that have been exposed and those not exposed to light.

The next part of my Invention is as follows :—A smooth surface of steel, platina, or other suitable metal, is coated with an extremely thin layer of silver; the silver is then made sensitive to light by the methods now well known, and a photogenic image is received upon it; the plate, with the image, is then placed in a horizontal position, and a solution of acetate of lead in water is poured upon it; a galvanic current is then made to pass through the plate and the solution, which causes a colored film to precipitate upon the plate.

With respect to this branch of my Invention, I claim the application of the colored films produced by a solution of lead when acted on by galvanism to the purpose of obtaining photogenic images, which are colored or otherwise diversified.

The next part of my Invention is a method of obtaining very thin silver

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plates or surfaces, for the purpose of economy in the processes of photography in which such are used, and also for the greater convenience of transport in travelling. For this purpose, I precipitate on a polished metal plate a thin layer of copper, by the galvanic process now well known by the name of electrotype ; I then cement or glue a sheet of paper or card to the back of the layer of copper, and when it is dry I remove the paper with the layer of copper adhering ; this copper is then silvered by dipping it into any suitable solution of silver.

The last part of my Invention consists in transferring pbotogenic images from paper to metal. In order to this the metallic surface is made sensitive to light ; the paper photograph is then placed on it with a sheet of glass in front, and the whole is pressed into firm contact by screws, or otherwise, and exposed to sunshine. A photograph on metal is thus obtained, which is afterwards to be fixed, and to be otherwise treated according to the effect intended to be obtained.

I have already described the means of transferring the image of one description of sensitive paper to another description of sensitive paper, and with respect to this branch of my invention, I claim the transferring photogenic pictures obtained upon sensitive paper to a metallic surface, or to a different kind or quality of sensitive paper ; I do not confine myself to the precise weights and measure of the substances employed in these processes which I have mentioned, since they may be varied according te circumstances ; but I have mentioned those which I have found on the whole to be the most convenient.

In witness whereof, I, the said William Henry Fox Talbot, have hereunto set my hand and seal, the Twenty-ninth day of July, One thousand eight hundred and forty-one.

WILLIAM HENRY (L.S.) FOX TALBOT.

AND BE IT REMEMBERED, that on the Twenty-ninth day of July, in the year of our Lord l841, the aforesaid William Henry Fox Talbot came before our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and every thing therein contained and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

HORNE.

Inrolled the Seventh day of August, in the year of our Lord eight hundred and forty-one.

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DISCLAIMER.

In the Matter of a Patent granted to William Henry Fox Talbot, of Lacock Abbey, in the County of Wilts, Esquire, for his Invention of "Improvements in Obtaining Pictures, or Representations of Objects," bearing date at Westminster, the Eiğhth February, One thousand eight hundred and forty-one, to which a Specification was duly enrolled.

DISCLAIMER proposed to be filed by the said William Henry Fox Talbot, pursuant to the provisions of the Statutes in that behalf, that is to say :—

I, the said William Henry Fox Talbot, do hereby disclaim the following part of the said Specification, that is to say, the part thereof commencing with the words, "The next part of my Invention is a method of obtaining photogenic images upon copper," and extending from those words and including the same continuously to the end of the said Specification. My reasons for such Disclaimer are, that the parts of my said Invention so disclaimed being of a separate character, and independant of the first and principal part of my said Invention, as described in the said Specification, and more of a scientific than a practical nature. I am advised that in any action brought for an imfringement of the said Patent objections may be raised, which would require evidence to be adduced in support respectively of those parts of my said Invention which I disclaim, thereby adding to the expense and difficulty of such action ; and therefore, although I still fully believe that I am the first and true Inventor of the said parts of the said Invention, yet I consider it advisable to disclaim them, as aforesaid.

In witness whereof, I, the said William Henry Fox Talbot have hereunto set my hand and seal, this Sixth day of March, in the year of our Lord One thousand eight hundred and fifty-four.

W. H. F. TALBOT. (L.S.)

To the Clerk of the Patents of England.

This is to certify, That William Henry Fox Talbot, of Lacock Abbey, in the County of Wilts, Esquire, has applied to me for leave to file with you the above written Disclaimer of a certain Invention for which Letters Patent were

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duly granted to him under the Great Seal of the United Kingdom, dated the 8th day of February l841, a Specification to which was duly enrolled; and having considered the said application, and no caveat having been entered against the same, I have accordingly granted leave to the said William Henry Fox Talbot to file his said Disclaimer, pursuant to the Statute in such case made and provided.

And I hereby also certify that any action may be brought in respect of any infringement committed prior to the filing of this Disclaimer, notwithstanding the entry or filing of the same, and pursuant to the Statute in that case made and provided.

A. E. Cockburn.

Temple, Feby 27th, l854.

Entered and filed with, the Clerk of the Patents of England, this Eighth day of March 1854.

Great Seal
Patent Office.

AND BE IT REMEMBERED, that on the Sixth day of March, in the year of our Lord l854, the aforesaid William Henry Fox Talbot came before our said Lady the Queen in Her Chancery, and acknowledged the Disclaimer aforesaid, and all and every thing therein contained and specified, in form above written. And also the Disclaimer aforesaid was stamped according to the tenor of the Statute made for that purpose.

Enrolled the Eighth day of March, in the year or our Lord One thousand eight hundred and fifty-four.

LAKE, Commr.

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