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Despaquis' Photo-Engraving Process.

M. Despaquis has observed, like all who have occupied themselves with this branch of study, that in an engraving it is necessary to have a grain inside the cavities, while the surface should be of a polished character in those portions destined to reproduce the whites of the image. He therefore set about to discover how such a result could be brought about. He applied to the metallic plate two films of gelatin, the first a thick one containing the grain, and the second thinner and absolutely free from grain. It is due to this second film that M. Despaquis is enabled to produce all the delicacy of half tone. His method of operation is as follows: In one thousand cubic centimetres of water are dissolved two hundred grammes of gelatin; to this are added twenty grammes of liquid Indian ink and four grammes of powdered pumice, the latter being finely ground and sifted through fine linen. Next, upon a plate of glass which has been waxed, he spreads a sheet of moistened paper, taking care to prevent the formation of air bubbles. The solution of gelatin, previously filtered and maintained at a slightly warmed temperature sufficient to keep it liquid, is then poured upon this sheet of paper. In this way a sheet is secured, covered with a thick film of gelatin having a very fine grain, uniformly spread throughout its body. When it is desired to make use of this prepared paper the second film is applied, and the sheet sensitized at the same time; to do this, it is immersed (prepared side uppermost) in a solution composed of:

Water	500	cub. cents.
Gelatin	1 to 15	grammes.
Bichromate of ammonia	15	"

After remaining in this liquid for some seconds the sheet is taken out, and by two of its corners (still prepared side uppermost) it is drawn over a gelatined plate, previously prepared with ox-gall, so that later the paper may be easily detached. The sheet, dried in a locality where it is screened from daylight, is cut a little larger than the cliché, and placed underneath the latter. The exposure of the prepared sheet to the light should be a third that necessary to give a carbon print. As in this latter process, as soon as the printing is finished, the impression is plunged into cold water, so as to transport the print, not to albumenized paper, but a plate of polished steel or copper; it is afterward put under pressure, and allowed to dry, and finally the image developed, as in the carbon process, with warm water. It is, indeed, treated as if it were a carbon print, rather more care being taken, however, because there is less adhesion between the gelatin and the polished steel. When the matrix plate has been secured in this way, a mould is made, either in the hydraulic press, as in the Woodburytype process, or in a rolling mill, covering the plate with a double sheet of very stout lead. The mill must be worked two or three times, so that every detail of the image is reproduced in the lead. Finally, you produce by the aid of the electrotype process a countermould, which is the plate from which the printed copies are produced.

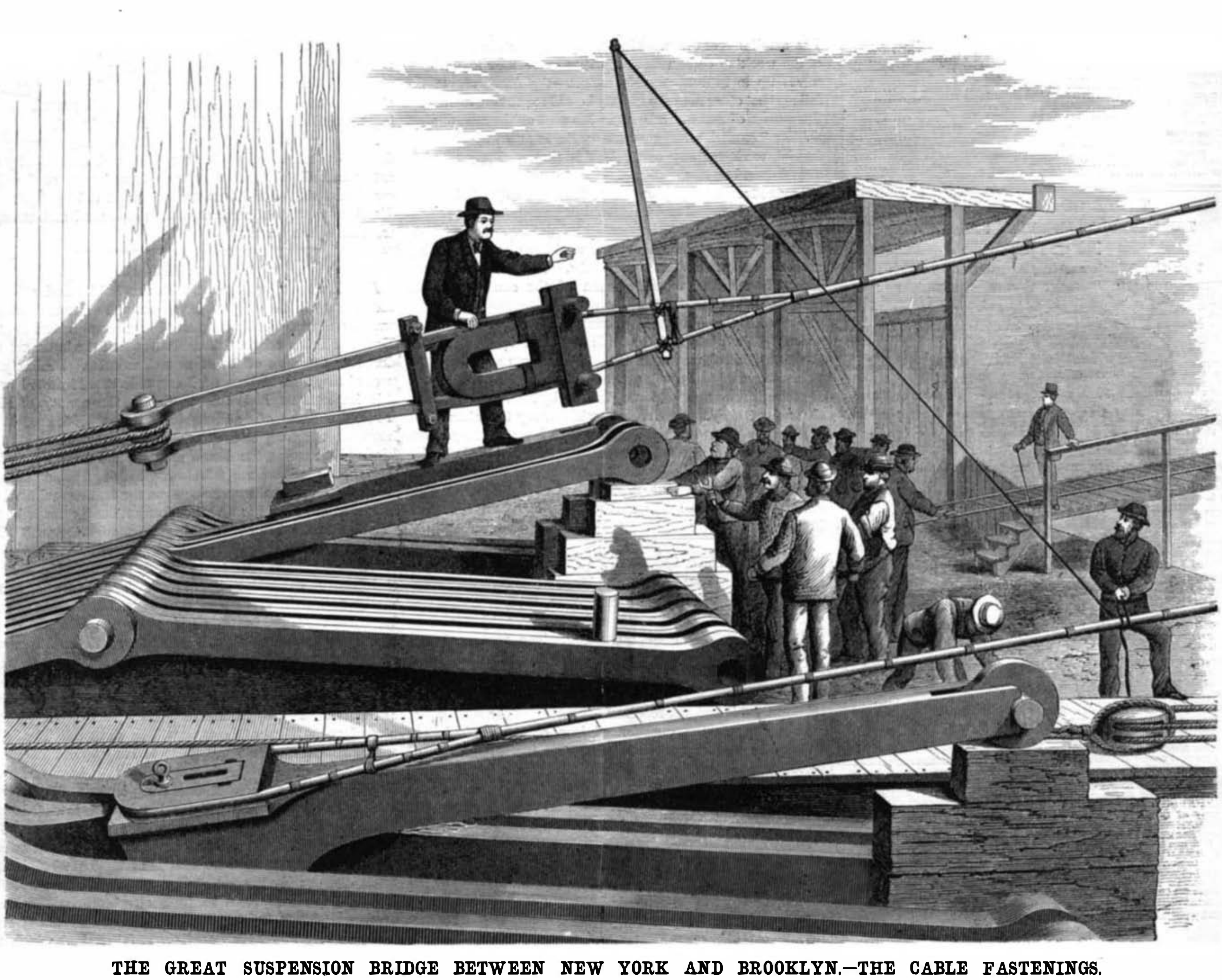
An Illuminating Cannon Shot.

One of the most simple and ingenious contrivances, for the purpose of investing a fleet with a zone of light through which no enemy could pass without being observed, has been devised by M. Ferdinand Silas, of Vienna, whose experiments with lifebuoys at Portsmouth have been reported in these columns. M. Silas' inextinguishable lightning shell is similar to a common shell, can be made to fit any gun, and can, accordingly, be projected to any distance. The projectile consists of three parts, one within the other. Within the shell proper is a lining of wet sponge, and within this is a glass bottle, which fills the whole cavity; the bottom of the shell unscrewing to admit of its entrance. This bottle is filled with various charges of phosphide, none of which, however, is to be less than ten pounds. A small channel is bored through the sharp point of the shell in order to allow the air to mix freely with the wet sponge, and there are a couple of apertures in the head which are plugged with wooden stoppers covered with leather. Through the movable bottom of the shell a steel striker is inserted, which is fitted with a spring, and communicates with the glass bottle within. When the light shell is fired, the spring striker is driven forward by the explosion like a gas check and so breaks the bottle; the water contained in the jacket of sponge then penetrates through the broken glass and saturates the phosphide; phosphuretted hydrogen is immediately generated in large quantities, by the pressure of which the stoppers are forced out and two streams of illuminating matter are poured upon the sea. The light burns with great brilliancy for a considerable time, and is claimed to be inextinguishable.—*London Times.*

CABLE FASTENINGS OF THE EAST RIVER BRIDGE.

In an article last week we followed the progress of making one of the strands that is to form the massive cables designed to support the roadway of the East River Bridge. These strands are a little over three inches in diameter, and the diameter of the cable when completed will be about fifteen and a half inches. We have seen the strand in place and resting in its permanent seat, the saddle, on top of the tower. We will now detail the manner in which the ends of these strands are secured and held in place at the anchorage at each end of the bridge. In the engraving, Fig. 1, which is taken from the Brooklyn anchorage, is shown the manner in which the wires are wrapped around the iron shoe as they are received at the anchorage. In the front of the engraving will be observed a massive iron bar, to one end of which this shoe, similar in form to a horseshoe magnet with armature in place, is attached. In folding the wires around it, as received from the carriers, the shoe lays horizontally, and the bight

[*Continued on page* 82.]



THE GREAT SUSPENSION BRIDGE BETWEEN NEW YORK AND BROOKLYN.—THE CABLE FASTENINGS.

[*Continued from first page.*]

of the wire forming the strand lays in the same direction, and is received and held in a groove made around the circumferential surface of the shoe. As we have already stated the two divisions of the strand, being divided by the shoe, are gathered and retained by temporary binding wires. This is well illustrated in Fig. 2. Suppose a skein of thread to be wound upon the hands of a person, one balf of the skein would be upon that portion of the hands in proximity to the thumbs, while the other half of the skein, as it passed around the hands, would contact near the little fingers. Gather the two divisions of the skein together, as shown, and bind them with thread, and we have the modus operandi of laying and binding the strands of the cables. The wires passing continuously around the shoes at each anchorage in the same manner as the skein of thread is wound around the hands.

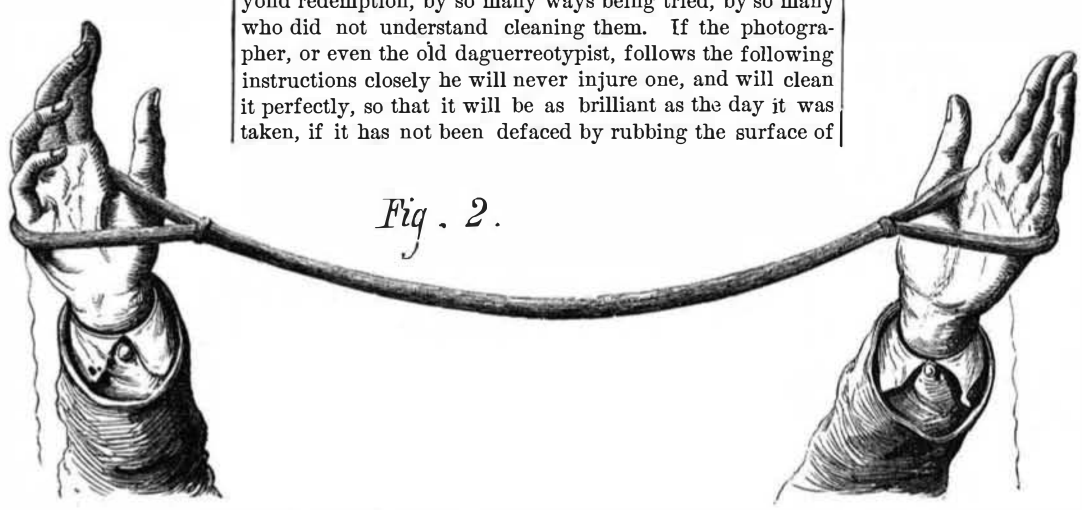


Fig. 2.

HOW THE STRANDS OF EAST RIVER BRIDGE ARE MADE.

The shoe is designed to permanently hold the strand, but its position on the iron bar, as shown, is only temporary and for convenience in laying it. When the strand is complete, two immense wrought iron bars are placed upon each side of the shoe and in juxtaposition with it, and are held firmly in place by means of clamps and bolts. Heavy and powerful tackle, with appropriate blocks and sheaves, is attached to the opposite ends of the iron bars, the wire ropes which pass around these sheaves are then conducted to the engine, and on a strain being taken, the shoe is lifted from the stud in the casting in which it has been held by its curved interior, is raised, turned so that its edges are vertical, is then let forward, thus lowering the strand, and depressed until it can be received between the ends of two of the massive eye bolts, when the pin shown as standing on the eye bolt is inserted in one of the eyes passed through the shoe at the bend and is received in the eye of the bolt that is upon its opposite side. The heavy irons and clamps that assisted in raising it, together with the tackle and blocks, are removed and laid aside until another strand is laid upon its appropriate shoe, to be raised and deposited in like manner between the next pair of eye bolts. A portion of the strands are secured to the lower row of the eye bolts, when another and similar set of eye bolts are placed above this row and their services are brought into requisition in like manner. We may add that these eye bolts are connected by means of a huge pin, upon which they are free to turn like a hinge, to another and similar set, and these in turn connected to others, until the series extends to the foundations of the anchorages, where they are securely held by appropriate fastenings.

In Fig. 3 we illustrate a view of the bridge as it will appear when completed and ready for traffic.

How to Clean Daguerreotypes.

To clean daguerreotypes perfect—so many ways have been published, so many daguerreotypes have been spoiled beyond redemption, by so many ways being tried, by so many who did not understand cleaning them. If the photographer, or even the old daguerreotypist, follows the following instructions closely he will never injure one, and will clean it perfectly, so that it will be as brilliant as the day it was taken, if it has not been defaced by rubbing the surface of it. First, all films, spots, and chemical action can be removed by the following method, and by no other that I have seen published or heard of. Now, bear in mind, the secret is hot water; where it should be used I will state. Second, when a party brings a daguerreotype to you to copy or restore, as they call it, if there are no defects on it, carefully take it apart, brush the surface, crossways the position of the picture, with a fine camel's hair brush, never up and down; then copy it. Third, if there is a film of some or all colors of the rainbow, spots or stains on it, have ready some hot water, cyanide, a pair of pliers, spirit lamp, and some distilled water.

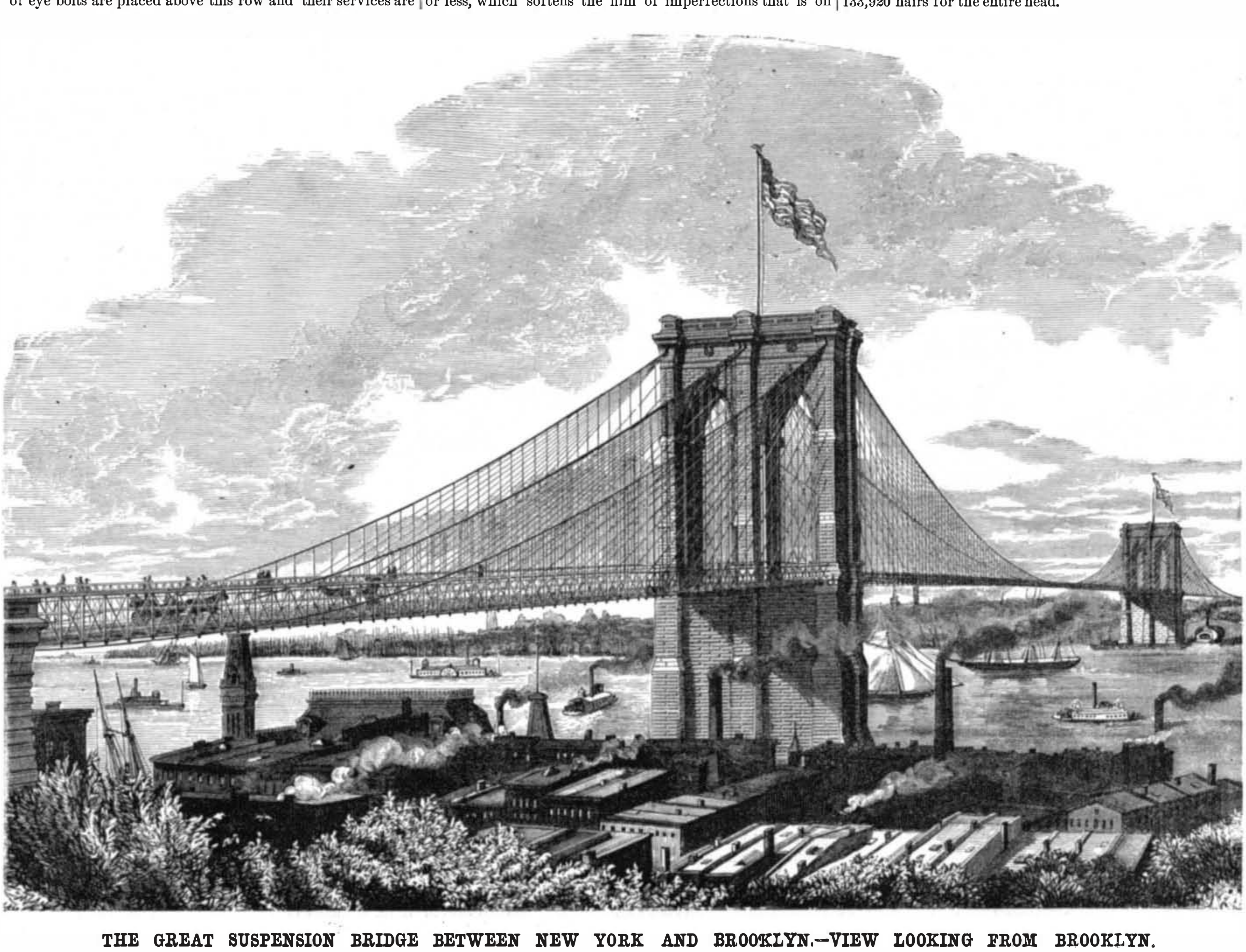
Next, proceed as follows: First, see that the water is filtered and clean, the cyanide also; brush as directed above; then take hold of your plate with the pliers, pour on the hot water first, leaving it on the plate for about a minute, more or less, which softens the film of imperfections that is on the daguerreotype plate or picture. The hot water is the whole secret of cleaning, with the other things mentioned. Cold water may do, and may not, as I have often found out, but hot certainly will. Next, pour the hot water off and pour on the cyanide solution, and it will immediately eat off all imperfections; then wash the picture, and it will become as brilliant as when it was first taken. As soon as the imperfections disappear, which will be in a few seconds, pour off the cyanide solution, and rinse the plate well with distilled water; lime water would spoil the picture—rain or soft water might do; then, with your spirit lamp in one hand and your pliers, holding the plate in the other hand, commence heating the plate from the the upper corners, and blow gently with your breath on the plate till it is perfectly dry; do not stop blowing till it is so, for it is liable to leave a stain where you would stop off blowing and commence again. After this, seal up the picture well with sticking paper, leaving no breaks in it to let in air on to the picture, for that is what causes the defects on the plate, the action of the atmosphere on the gold surface that is over every good daguerreotype picture. Now, you will have as perfect a picture as the day it was taken.

For such jobs we get from one to five dollars, according to the condition and size of picture.—*St. Louis Practical Photographer.*

The Mississippi Jetties.

General Beauregard says concerning the Mississippi jetty system: There need be no fear of the jetty structures notwithstanding the ravages of the teredo, so fatal to all modern structures in the waters of the Gulf. So copious is the alluvial deposit upon the willow mattresses of which the jetties are composed that the wood is protected by a thick coat of mud, and the teredo, which requires free access of salt water to thrive, is balked of its opportunity.

DR. ERASMUS WILSON, an authority in England on cutaneous disorders, has been investigating the number of hairs in a square inch of the human head, and estimates that it contains on an average about 1,066. Taking the superficial area of the head at 120 square inches, this gives about 133,920 hairs for the entire head.



THE GREAT SUSPENSION BRIDGE BETWEEN NEW YORK AND BROOKLYN.—VIEW LOOKING FROM BROOKLYN.