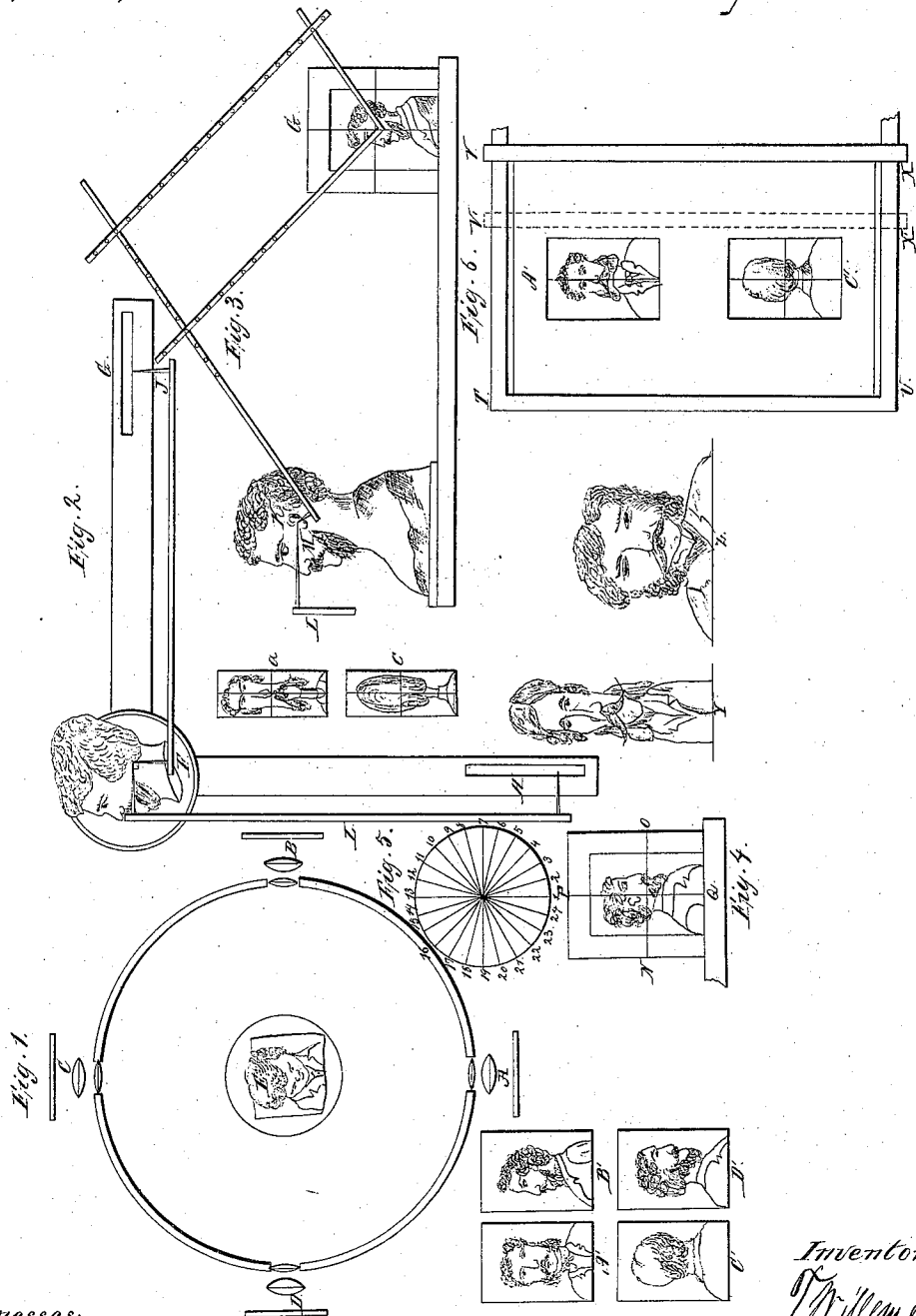


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Photographing Sculpture &c.,

N^o 43,822,

Patented Aug. 9, 1864.



Witnesses:
 L. Dimes
 Jos. L. Corbett

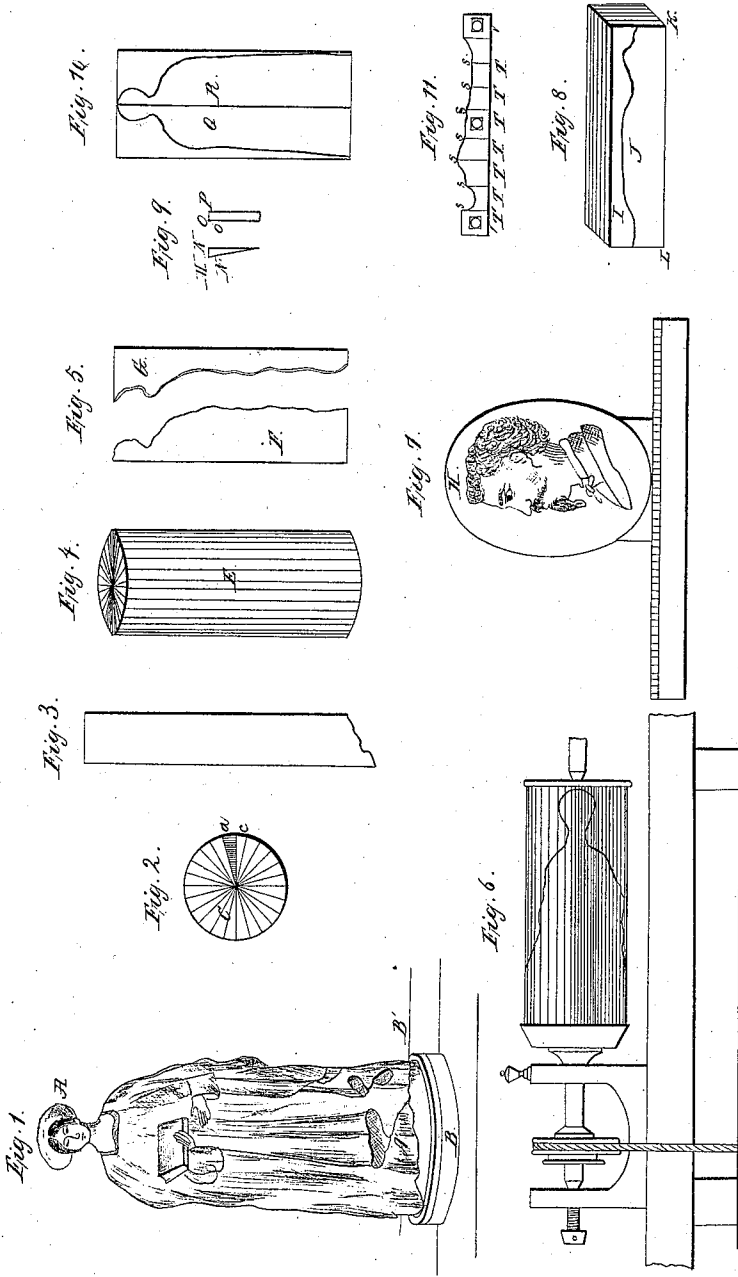
Inventor:
 F. Willeme
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Witnesses:
L. Brown
J. L. Coombs

Inventor
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UNITED STATES PATENT OFFICE.

FRANÇOIS WILLÈME, OF PARIS, FRANCE.

PHOTO-SCULPTURE.

Specification forming part of Letters Patent No. 43,822, dated August 9, 1864.

To all whom it may concern:

Be it known that I, FRANÇOIS WILLÈME, of Paris, in the Empire of France, have invented certain new and useful improvements in the means and apparatus for copying and reproducing sculpture and other objects of art; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings.

This invention relates to an improved process termed "photo-sculpture," which is based on the employment of photography in connection with the pantograph. By this improved process I am enabled to produce sculpture exactly similar to the model, whether living or otherwise, with much greater rapidity, at a less cost, and by the aid of persons having no previous knowledge of the art. I may further lessen the time necessary for the sitting and produce sculpture of larger or smaller dimensions than the original, or in any other proportions desired.

The operation is effected as follows: I place the model E, Figure 1 of Plate 1 of the annexed drawings (living or otherwise) on the center of a ring furnished with cameras A B C D, placed at equal distances apart at the same height, or it may be dark-chambers in which the model may be delineated. The greater the number of the object-glasses the greater finish the sculpture will attain. I will here only refer to four glasses, as seen in the drawings, in order to render the description clear, although their number may be varied, and generally consists of from twenty to thirty. All the object-glasses are arranged in such manner as to act simultaneously when desired, for which purpose I connect all the tablets covering the object-glasses together by means of cords, the ends of which are held in the hand or hands of the operator. The opening and closing of the tablets is thus rendered simultaneous. I may also employ any other means for producing said action. The time occupied in a sitting is not longer than that ordinarily required for taking a photograph. These object-glasses are placed at equal distances from the center and from each other in the examples shown in the drawings. The first one, A, photographs the face A'; the second, B, the profile or side view on the one side, B'; the third, C, the back C',

and the fourth, D, the profile or side view on the other side, D'. The photographs thus obtained represent several aspects of the same subject at the same moment and in the same position; and I may use one, two, or more of these proofs by arranging them so as to be able to follow their outlines by means of one, two, or more pantographs. It is necessary to illuminate the photograph at the back by means of a lamp or other means.

Figs. 2 and 3, Plate 1, represent a plan and elevation of the apparatus furnished with two pantographs, I L, of a suitable kind, acting at right angles on the material to be sculptured, (which may be either hard or soft,) carried on a revolving platform, F, divided into as many parts as there are object-glasses or photographic pictures. In some cases where one pantograph only is used, which I generally prefer, the platform F may be made to move backward and forward in addition to its rotating motion. Fig. 2 represents the application of two pantographs having various movements. Two tablets, G H, are applied, so as to approach or recede from the revolving platform F, which motion is regulated by the form of the sculpture to be produced. These tablets receive the one, H, the photograph A', obtained by the object-glass A; the other, G, the photograph B', obtained from B.

In order that the photographs shall have positions corresponding exactly with each other when placed on the vertical tablets G H, said tablets are traversed, together with the photographs, by one or several horizontal and vertical lines, N O P Q, Fig. 4, and by the aid of pointer J of the pantograph I, I follow the contour of the photograph B', placed on G. The opposite pointer K executes the same movement as the pointer J, and thus produces an exact profile on the material to be sculptured on platform F. The other pantograph, L, which is at right angles to I, acts in the same manner and reproduces the figure A'. I thus obtain by simultaneous or successive operations not only the external contour lines of B', but also the contour lines of A' at right angles to it, one being the profile-outline, and the other the full-face outline, each photographic proof furnishing its contingent to the work. I can also avail myself of the effects of light and shade. Whatever may be the number of object-glasses or pictures, I divide

and number in exactly the same manner the platform F, so that every time fresh photographs are placed in the tablets I may place the platform F at a corresponding division. Fig. 5, Plate 1, represents the platform with twenty-four divisions, suitable for the use of two pantographs, by combining the letters and figures—viz., No. 1 in H corresponds to No. 7 in G; No. 2 in H corresponds to 8 in G; No. 3 in H corresponds to No. 9 in G; No. 4 in H corresponds to 10 in G, and so on up to 24 in number in H, and terminating in 6 in G.

In order to obtain bas-reliefs the object-glasses employed form a semicircle only, the platform F being also in a half circle, represented by R S from Nos. 1 to 13. In order to obtain caricatures, the photographs A' B' C' obtained should be placed on a strip of india-rubber previously stretched on a frame, T U V X, Fig. 6. On the india-rubber returning to its original position, T V' and U X', it will be readily understood that the figure A' C' will have been subjected to a sensible amount of narrowing (see *a c*) in the width only. The figure B', giving the profile and occupying the center between C and A, Fig. 1, and No. 7, Fig. 5, not requiring any change of form, is not placed on the india-rubber. This profile, which is the face for a bas-relief, should always have the same outline as a round figure. In order to obtain bas-relief sculpture by the aid of these contracted proofs, (with the exception of the center one,) I employ the same means as above described, with this difference, however, that when one tablet receives a contracted photograph for furnishing the projections the other will receive a photograph not similarly contracted for giving the outline. In order to obtain round grotesque sculpture, as at *y z*, it is only necessary to employ the pictures elongated by the india-rubber, the process being otherwise the same as for producing round figures before described. In order to obtain counterparts, it is sufficient to take casts directly from the proof obtained by turning it round.

If photography, assisted by the pantograph, does not impart to this sculpture a colossal size, I obviate this by the employment of a solar microscope or other known means for enlarging photographic proofs. When using a solar microscope, the vertical plane which receives the enlarged photographic image may be substituted for the tablets G H. The smallest microscopic objects may thus be sculptured on very large proportions. In order to obtain sculpture in marble, stone, wood, ivory, plaster, or other hard matter, I replace the points K M of the pantograph by means of drills, scrapers, or pointers of greater hardness than those used for modeling soft materials.

Plate 2 of the drawings represents the means employed for producing what I term "mechanical sculpture" by the application of numerous outlines combined together. For this purpose may employ any material capable of being

divided into thin sheets, cut, turned, stamped, or planed, such as all kinds of metals, marble, stone, mother-of-pearl, ivory, bone, shell, alabaster, leather, pasteboard, india-rubber, and all kinds of wood. In order to render the process understood, I will suppose the operation to be carried out in wood for producing the model, Fig. 1, Plate 2, in the round, which rests on a platform, B, divided into forty parts, and capable of rotation. I divide a circle, G, Fig. 2, Plate 2, into forty parts. It may be of equal size or smaller or larger than the greatest diameter of the model, accordingly as I wish to obtain a product of equal size or of larger or smaller dimensions. I plane the long strips of wood D, Fig. 3, Plate 2, so as to produce sharp angles *a b c*, forming one of the forty divisions of the circle G, Fig. 2, in such manner that forty of these planed strips, when cut of the height of the model and united, will form a cylinder, E, Fig. 4, Plate 2. I then, by means of a pantograph or drawing apparatus, trace on each strip one of the outlines of the model from A' to B', (A' corresponding to the center of the platform). I then turn said platform one division and trace on the second strip of wood a fresh outline corresponding to this new division, and so on for each of the forty divisions. I then cut the outline on each of the forty strips of wood by means of a saw or otherwise, and obtain two pieces, F G, from each strip, Fig. 5, Plate 2. By uniting the pieces G by means of glue pegs, nails, or otherwise, I obtain a form on which to mould the pieces F, forming the sculpture in the rough, which is finished off by removing all the small angles left on each of the strips. The method of connection varies according to the nature of the strip to be united.

The bas-relief H, Fig. 7, Plate 2, is placed in such manner as to slide in a groove, each outline being reproduced on paper by sliding it a division each time. I then take as many pieces of wood, which should be of considerable thickness, as there are divisions, and consequently of outline drawings, and then cut each of these pieces according to the outline of one of the divisions on paper. I thus obtain from each block of wood two pieces, I the hollow part and J the relief, as seen at Fig. 8, Plate 2. Then by splitting each piece of wood into sheets of a thickness determined by that of the divisions of the bas-relief, I obtain as many copies of the bas-relief identical with the model as there are sheets obtained from the block of wood, it being simply necessary to unite all the parts together in the same order as the divisions. From each strip may be formed a mold or counterpart in metal, and consequently a similar number of strips of materials be obtained capable of being stamped out or otherwise produced.

In order to obtain a large number of proofs at a time, I may take each strip, as G, forming a part of the sculpture, whether of wood or metal, and form a cylinder, as at E, Fig.

4, Plate 2, by means of this strip and other plain angular strips of wood solidly connected together at the two ends, and mount said cylinder in a lathe, as at Fig. 6, Plate 2, and then turn it off to the form of G, as if producing a simple molding, and on removing said cylinder I shall have obtained forty copies of the same profile, G. By proceeding in the same manner for each of the forty patterns G, I may obtain forty copies of the statue by taking a piece of each of the forty turned cylinders and connecting said pieces together according to the order of the forty divisions traced by the model. I may employ cylinders of solid woods, and turn and afterward cut them, as described, only in this case the thickness of the saw should be taken into consideration. The model or sculpture in modelers' clay may also be cut into sheets by means of a very fine saw or wire. When it is wished to produce copies of the same size, these sheets would serve as patterns directly in the manner above mentioned. When working from nature with the photograph and the pantograph, as before stated, I can reproduce each of these photographs on a strip of wood, divided in the center, as at Q R, Fig. 10, Plate 2, which strips are then cut to the outline and afterward united. This arrangement may also be applied to serve as a guide in modeling by cutting them out in thin material of the same form as the photographs. After having connected either the strip of wood or the proof on thin material or metal, it is only necessary to fill up the spaces between the strips with clay in order to produce an exact model. Fig. 11, Plate 2, represents a half section of a mold formed of strips of metal, such as steel, iron, or copper, produced in the manner above described for wood, which are then finished with shears. The strips are secured by nuts V, and each of them is filed at S T, the file-marks being made

deep at T and but just visible at S. In this manner the mold, on being formed, will be studded with small holes, which serve to render it porous without prejudice to the beauty of the model to be obtained.

I can employ any suitable photographic system, as also any other mode of obtaining pictures in the condition above stated as necessary and sufficient, as also any arrangement for producing the simultaneous action of all the object-glasses. I may further employ any kind of photograph, diagraph, or other apparatus, and use one, two, or more pantographs combined, or any other apparatus suitable for copying or drawing will answer the purpose desired, and enable the production of the system of photo-sculpture herein described.

Having described the nature of this invention and the manner of performing the same, I declare that what I claim as the invention to be protected by Letters Patent is—

The process by means of which I obtain sculpture of any desired size from a living or inert subject, said process consisting in the application of photography under certain conditions, in combination with one or several pantographs or equivalent apparatus, and of a platform for carrying the subject, which is divided into as many parts as there are views of the subject, model, or object to be photo-sculptured, this platform being capable of assuming all the positions corresponding to those of the views of the subject, as hereinbefore described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

F. WILLEME.

Witnesses:

J. W. BROOKS,
C. A. MART.