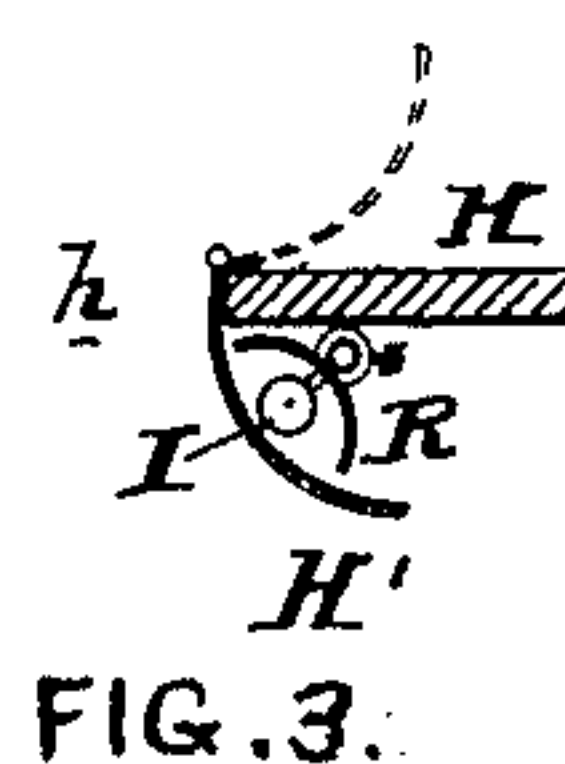
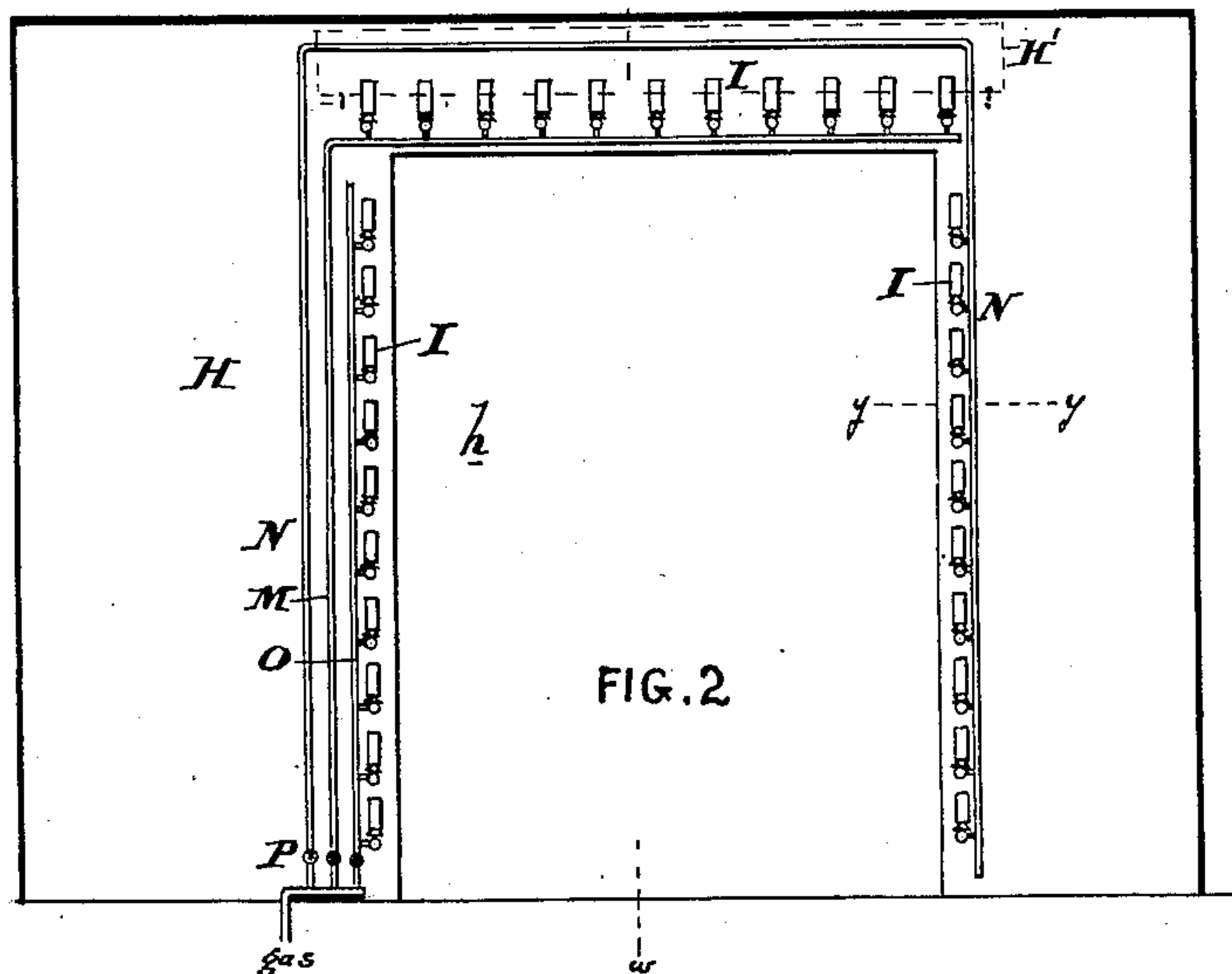
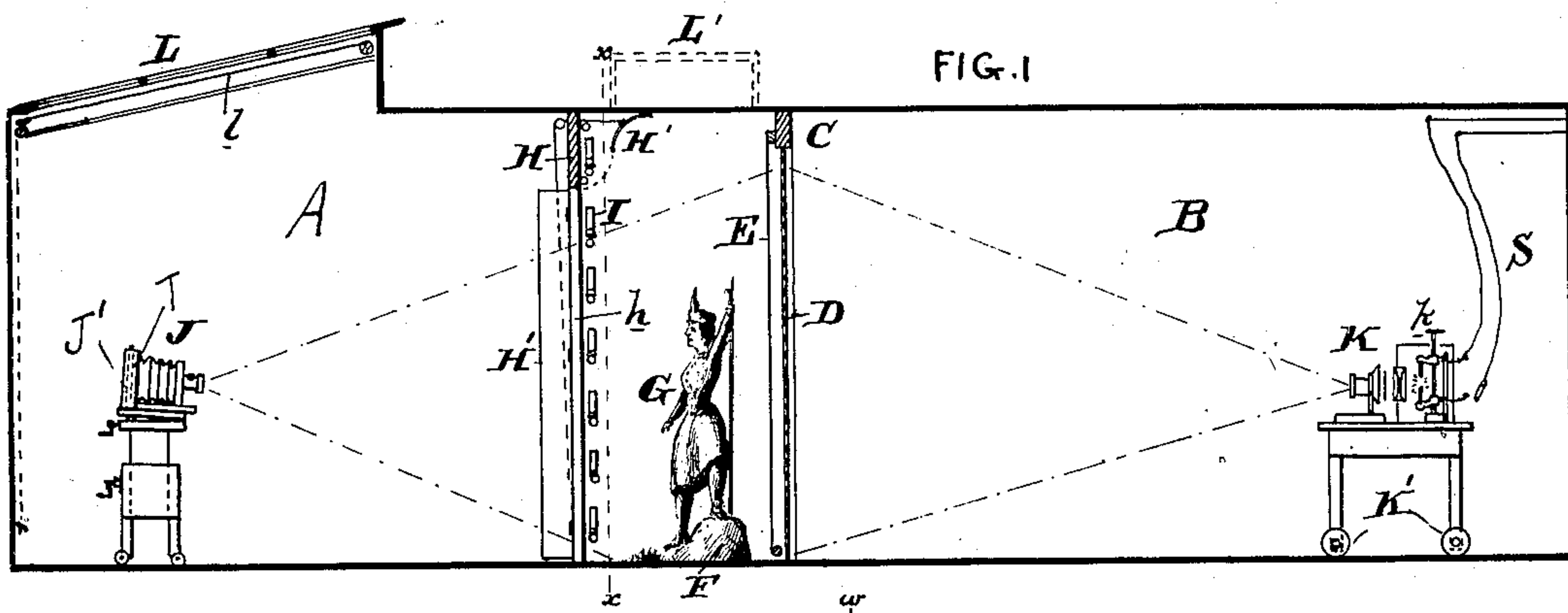


Patented Aug. 28, 1900.

ART OF PRODUCING PHOTOGRAPHIC NEGATIVES.

(Application filed Mar. 19, 1897.)

(No Model.)



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ART OF PRODUCING PHOTOGRAPHIC NEGATIVES.

SPECIFICATION forming part of Letters Patent No. 656,769, dated August 28, 1900.

Application filed March 19, 1897. Serial No. 628,280. (No specimens.)

To all whom it may concern:

Be it known that I, RUDOLPH M. HUNTER, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in the Art of Producing Photographic Negatives and Means Therefor, of which the following is a specification.

My invention has reference to the art of producing photographic negatives and means therefor; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

In many uses of photography it is desirable to produce a suitable background to a figure or group of figures in the foreground to heighten the effect and be in proper keeping with the impression to be given by the position, act, or dress of the figure or figures. This is especially necessary in the new art of photo-engraving by half-tone processes. As heretofore carried out, this result has been secured by photographing the person or figure and after completing the negative printing it upon sensitized paper and toning and fixing the print. The print so produced is made large and is expensive. This print is then given to an artist, who paints in black and white the background. The composite print so produced is set up and a negative of the desired size for the half-tone cut is produced by a second photographic operation. Such process is slow and expensive and the work is poor and easily detected, as it is difficult to blend the background to the figures and the lines of the brush are readily discernible in the finished engraving. In some cases the figures are cut out of the print and pasted upon a black and white wash-drawing; but this is even more objectionable and expensive than the case where the background is painted upon the print. Furthermore, in some cases the backgrounds must be of such a complicated nature that the expense of proper and careful drawing could not be had within the cost possible and the result is inferior work. The finished engraving likewise is devoid of realistic effect. Aside from the production of negatives for commercial work in engraving the artistic result of showing a person in any country and under any desired surroundings may be

secured at practically no more expense and but little more time than the taking of an ordinary negative. While all these effects may be secured by elaborate preparation of backgrounds, the cost would be prohibitory and the scenic effects of necessity limited in variety. Aside from this the indication of the brush would be ever present and out-of-door effects but faintly realized. My invention is designed to secure all of the advantages of this art without its disadvantages.

In carrying out my improved process I subject a sensitized plate or film to the reflected light (sunlight or artificial light) from an object or person, then envelop the object or person in darkness, and subsequently subject the same plate or film to a second exposure while maintaining an illuminated background, and finally develop and fix the negative so produced. By this means the background will be blended with the figure or object and foreground. In carrying out this process the person stands in front of a black velvet or other dark dead background, so that the plate is only affected by actinic rays from the person and foreground. After this is done the person and foreground are enshrouded in darkness, the black-velvet background is rolled up, and a sharp picture is projected upon a thin white screen by a stereopticon operated by electric, calcium, or acetylene light and photographed upon the exposed negative in the camera, the figure and foreground shielding or blotting out those portions of the background which correspond to that portion of the plate previously impressed by the figure and foreground. This double exposure secures only a single active exposure for each portion of the detail of the picture, and as the first exposure defines the demarcation of the second exposure the blending must of necessity always be most perfect. By this means the vast number of photographic views available by the stereopticon may be made to supply an almost-infinite variety of backgrounds, and by adjustment of the stereopticon these may be enlarged to the requisite size desired. It will be seen that the very finest detail, even to the very leaves of the trees, may be brought out in the completed negative. The vast possibility of this method of producing a composite negative will be self-

apparent without further suggestion in this direction. A negative thus prepared will be complete and ready for the engraver, if it has been made through the line-screen employed
 5 by the photo-engraver in making half-tone work, or the negative may be first made large and the print taken from it subsequently used to produce the half-tone negative for the engraver. In cases where the prints are to be
 10 used as ordinary card-photographs the negative is finished in the first instance without the employment of the line-screen.

The apparatus for conveniently carrying into practice the above process may be briefly
 15 described as follows: A long room is divided into two parts by a transparent white screen, which may be of textile material or frosted glass. A stereopticon is so arranged, preferably to the rear and slightly to one side, that
 20 it projects a strong sharp image upon the screen representing any subject desired. To this portion of the invention it is requisite that the picture should be of a luminosity having proper actinic characteristics, so as
 25 to readily affect the negative. An arc-light is preferable; but, if desired, a strong calcium-light or acetylene-burner may be used. The screen may also be made more or less fluorescent by employing calcium compounds, such
 30 as sulfids or tungstates. These may impregnate or slightly coat the screen to heighten the atmospheric effects. Other chemicals, such as barium and strontium sulfids having similar properties, may be employed in lieu
 35 of those specified. In front of the said screen I employ a removable background of black material, preferably velvet, the object of which is to avoid the reflection of light-rays. In front of this black background the foreground
 40 is placed to receive the person to be photographed. Surrounding and in front of the foreground is arranged a series of intense incandescent burners which have fine qualities for photographic purposes. These lights take
 45 the place of sunlight, and by proper regulation the soft shadows of daylight may be secured. In advance of these lights and shielded from their direct rays is arranged the camera, provided, if desired, with the glass
 50 screen. With such an apparatus it is evident that the sunlight may be dispensed with in the process of producing the negative. The room being closed to all external light greatly facilitates the operation, since the light or darkness
 55 is readily produced by simply turning on or off the lights. I do not, however, limit myself in producing the reflected light to incandescent lights, since arc-lights or sunlight may be employed, if so desired.

60 In using the incandescent lights they are arranged back of a rectangular frame in two vertical and one horizontal rows, each of which is provided with an independent regulator-valve, either for gas or air, or both. By
 65 this means the light may be made more intense upon the top and one side than the other to correspond to sunlight and to secure

any degree of shadow desired. These lights may be provided with suitable reflectors to concentrate the light upon the person, and, 70 unlike arc-lamps, they produce a diffused and soft light, intense withal and most active in affecting the sensitized film, producing in their effect the results more nearly resembling those of sunlight than any artificial 75 light which has heretofore been employed.

My invention will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation through 80 apparatus for carrying out my improved process of photography. Fig. 2 is a vertical cross-section of same on line *xx*. Fig. 3 is a cross-section on line *yy* of Fig. 2. Figs. 4 and 5 are elevations of the setting during the first 85 and second exposures of the photographing, and Fig. 6 is a print from the composite negative made from the two exposures of Figs. 4 and 5.

A B is a long room, which need have no external light. It is divided into the rooms A 90 and B by a partition C, having a semitransparent screen D, formed of ground glass, celluloid, or textile fabric. In the room A and close to the screen D is a curtain E, preferably of black velvet or any material devoid 95 of the property of reflecting the actinic rays of light. It is preferably provided with a roller at the bottom, with which it can be quickly rolled up out of the way, so as to expose the screen D. Of course where the room 100 has sufficient height this curtain may be lifted bodily, like a scene in a theater. H is a second division having an open passage-way *h*, constituting substantially a proscenium of 105 small size, through which the exposures are made and back of which the illuminating apparatus or incandescent lights I are located.

J is the photographic camera, which may be of any suitable type or construction, but 110 preferably provided with a glass or transparent screen, the most desirable form of which is a plate of glass, with the crossing lines etched, printed, photographed, or otherwise formed upon it as is well known. 115

In the room B, to the rear of the screen D, is arranged a stereopticon K, provided with an arc-light *k* for projecting a strong image upon the screen D. The stereopticon is supported upon a table having wheels *K'*, so as 120 to be quickly adjustable to and from the screen to adapt the dimensions of the image to the foreground F and figure G.

S shows flexible electric circuits for supplying current to the arc-lamp of the stereopticon and permit adjustment thereof. While I 125 prefer an arc-lamp for this purpose, because of the high actinic power, nevertheless strong calcium, acetylene, or other light may be used, if desired. These latter would require 130 considerably longer exposure, and would be less desirable on that account.

The incandescent lights I when used are arranged in three series—namely, on both

sides and at the top of the opening *h* of the partition *H*. Each series is supplied from a separate pipe, three pipes *M N O* being provided, each controlled by a valve *P*. *M* is the pipe for the top or horizontal series, and pipes *N* and *O* supply the gas to the two vertical side series. If desired, suitable reflectors *R* may be employed back of the lights *I* to increase the light upon the object. By adjusting the valves *P* the lights above or on either side may be made more or less intense, as desired, so as to produce the effect of light and shade and soft shadows, such as produced in the best studios under the action of sunlight. This is most important, as it is necessary to artificially illuminate the top, sides, and front of the foreground and person, and yet to have a different degree of actinic reflection, so as to produce the high lights so necessary to a finished photograph or engraving. Ordinarily the upper lights and left-hand side lights are made more brilliant than the right-hand side lights; but this may be changed to suit the fancy or picture to be produced. In some cases the lights, except upon one side or top, may be put out or lowered to create the effect of high light solely from one direction.

The partition *H* is provided with hinged screens *H'*, as shown in Figs. 1 and 3, for turning in to shield the light from the person and screen *D* when it is not desired to put the lights completely out during the second exposure. If desired, any other means of screening the lights may be used.

In this application I do not claim the specific features comprising the mode of lighting the object by incandescent lights and the regulation of the shades and shadows, as that is reserved for further applications.

The operation of the apparatus will now be understood and may be described as follows: Let it be assumed that the engraving to be made shall represent a woman in Alpine garb climbing the mountains. The curtain *E* is dropped and the person *G*, properly garbed, is placed in position, with a suitable simple foreground *F* immediately in front of the said curtain *E*. The lights *I* are properly adjusted for light effect. The effect to the eye is then as shown in Fig. 4. The sensitized plate or film is placed in the camera, together with the screen *T*, properly disposed. When this is done, a proper time exposure is made. The reflected light has then affected the plate; but where the light fell upon the dead-black curtain *E* there was no action upon the plate, the reflected rays being too weak. The plate therefore, except so far as the impressions of the person *G* and foreground *F*, is the same as if never exposed. The lights *I* are then quickly dimmed or extinguished. If not fully extinguished, the screens *H'* may be turned over them. The curtain *E* is then removed, and while the person *G* still stands in position a strong image is cast upon the screen *D*, representing the mountainous background. As this

is from a photograph from nature it is evident that the effect will be most realistic. During this second exposure that portion of the background which should be covered in the finished picture by the foreground and person is blotted out from the camera by the foreground *F* and figure *G*, as shown in Fig. 5, so that the first exposure is not marred and the blending of the two exposures is most perfect. While it might not be impossible to make two under exposures of the person, it is not desirable, because, first, to do so would be to have light in the room *A* when the background was projected on the screen *D*, which would destroy its sharpness, and, secondly, while a slight movement of the person *G*, posing as a blotting-out shadow to the background, would not injure the negative such movement would blur the picture if it occurred on a second exposure of the figure. The negative is then removed and developed and fixed in the usual manner. The print from such negative will be as shown in Fig. 6. The negative, if to be used for engraving, will be of the proper size for the half-tone engraving, and consequently only a minimum expense is necessary in this regard. Furthermore, the resulting engraving will be more sharp and perfect, since only a single negative is necessary and none of the sharpness is lost, as necessarily results in second negative when produced in this manner. The saving in time in this manner of producing the negative for the engraving process is very great and is self-evident without further comment.

It is evident that while I prefer to take the exposure of the person or foreground first the background may be taken first and foreground last. The objection, however, to this is that it would be difficult to be sure of the proper light and shade being thrown upon the figure for good effect, and to use special adjustment would be to risk danger of the person moving by being required to remain posed too long. Therefore, so far as my invention is concerned, it is immaterial which exposure is made first, and in reciting the exposure of the foreground and person before the background in the claims I do not confine myself strictly thereto, as the reverse would manifestly be the full equivalent, broadly considered.

The two dotted lines *J' T* in the left end of the camera correspond to the negative and screen when the negative is to be directly prepared for engraving-work. Where the negative is to be used to print from—as, for instance in card-photographs—the glass screen *T* is omitted from the camera, and in that case the light and shade are blended as customary in photography. Fig. 6 represents such a photograph. When the glass screen is used in the camera, the surface of the negative will be made up of dots or squares more or less dense or dark, as is well known. It is of course evident that for engraving work the

negative produced may be directly upon the plate to be etched or upon a glass and used subsequently for preparing the metal plate, as will readily be understood by one skilled in the art. I wish it to be understood, therefore, that where the negative is spoken of it is not limited to a transparent support for the film, but comprehends the subject broadly without regard to the nature of the support for the film.

For illustration-work for newspapers and periodicals my invention has a great commercial utility and value, and for general photography it has a uniqueness which, from the possible novelties of the poses and associations, will go far to make it a popular system of studio photography. For instance, it is only necessary to have some good negatives for the stereopticon to bring into intimate association any one in this country with any personage of rank or otherwise or scene or structure in any part of the world.

While I have described my invention as employing artificial light for securing the reflected light from the foreground and figure, it is to be understood that I may employ sunlight by providing a suitable skylight L, having a removable screen l for darkening the room A when desired. By using artificial light it is not necessary to secure a location of room which could provide a skylight. I would also remark that while the stereopticon is also described as operated by electric or other artificial light I may, if desired, employ sunlight here also by reflecting it, as is commonly done in solar-printing. In practice it is desirable to put the stereopticon K slightly to one side, so as not to show the glare of the beam of light as it leaves the object-lenses, as will be readily understood. The camera may be provided with the usual shutter, to be used as customary. It is evident that it would be most desirable in practice after the first exposure to close the shutter, then to dim the lights, raise the curtain E and focus the background sharp, and finally to take the second exposure and again close the shutter. This operation will be understood by all skilled photographers.

While I prefer the construction shown, I do not limit myself thereto, as the details may be greatly modified without departing from the essential features of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. The process of producing a photographic negative which consists in subjecting a sensitized plate or film to the reflected light from an object, then enveloping the object in darkness, and subsequently subjecting the plate or film to a second exposure while maintaining an illuminated background, and finally developing and fixing said plate or film, whereby the composite negative will have a background perfectly blended with the foreground.

2. The process of producing a photographic negative which consists in subjecting a sensitized plate or film to the reflected artificial concentrated light from an object, while maintaining a black or dark background, then enveloping the object in darkness, and subsequently while retaining the object in the same position subjecting the plate or film to a second exposure while maintaining an illuminated background, and finally developing and fixing said plate or film, whereby the composite negative will have a background perfectly blended with the foreground.

3. The process of producing a composite photographic negative which consists in focusing a camera upon an object and a background, then subjecting a sensitized negative plate or film in the camera to two exposures, while so focused, one of which receives the impression of the object and the other of the background with the object in position and shielded from light in front whereby it acts as a silhouette to shield a corresponding portion of the background, and finally developing and fixing the negative plate or film.

4. The process of producing a composite photographic negative which consists in focusing a camera upon an object and a background, then subjecting a sensitized negative plate or film in the camera to two exposures, one of which receives the impression of the object and the other of the background and in which the object and background are alternately thrown into darkness, and finally developing and fixing the negative plate or film.

5. The art of producing a composite negative which consists in arranging an object and background in focus of a camera, and while maintaining them in the same relative position to the camera and exposed negative alternately illuminating said object and background whereby when photographing the background the object will blot out or shield the proper amount thereof so as not to overlap the impression of the object, and finally developing and fixing said negative plate or film.

6. The art of producing a photographic print which consists in first forming a composite negative by arranging an object and background in focus of a camera, and while maintaining them in the same relative position to the camera and exposed negative alternately illuminating said object and background whereby the object when photographing the background will blot out or shield the proper amount thereof so as not to overlap the impression of the object, then developing and fixing said negative plate or film, and finally printing the negative upon a sensitized sheet or surface.

7. The art of producing a composite negative which consists in arranging an object and background in focus of a camera, and while maintaining them in the same relative

position to the camera and exposed negative alternately illuminating said object and background whereby the object when photographing the background will blot out or shield the proper amount thereof so as not to overlap the impression of the object, and finally developing and fixing said negative plate or film, then printing from the composite negative so produced upon a sensitized sheet or surface, and subsequently forming a second negative for photoengraving or half-tone process by photographing the print through a screen upon a second sensitized plate or film.

8. In the art of photography, the method of producing a composite picture which consists in subjecting a sensitized plate to two exposures in rapid succession of illuminated objects one overlapping the other in the line of vision, and in which one of the exposures has the rear object partly blotted out by the other or front object, developing and fixing

the negative, and finally printing the said negative upon a sensitized paper or film.

9. The process of producing a composite negative which consists in focusing the light from an object and background upon a sensitized plate or film through a screen to obstruct a portion of the rays of light, then subjecting the sensitized negative plate or film rapidly to two exposures without moving the plate one of which receives the impression of the object and the other of the background with the object in position to shield a corresponding portion of the background, and finally developing and fixing the negative plate or film.

In testimony of which invention I hereunto set my hand.

R. M. HUNTER.

Witnesses:

R. M. KELLY,

J. W. KENWORTHY.