

No. 706,774.

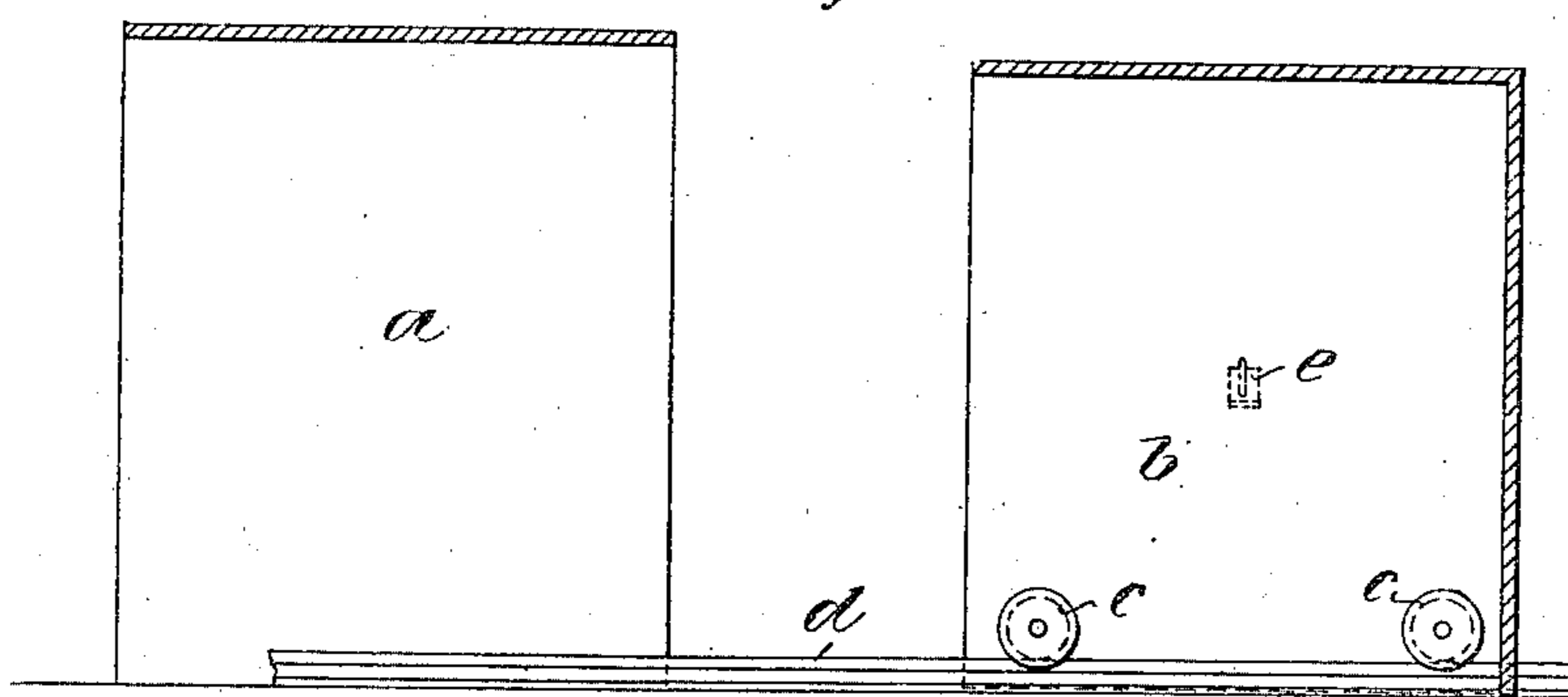
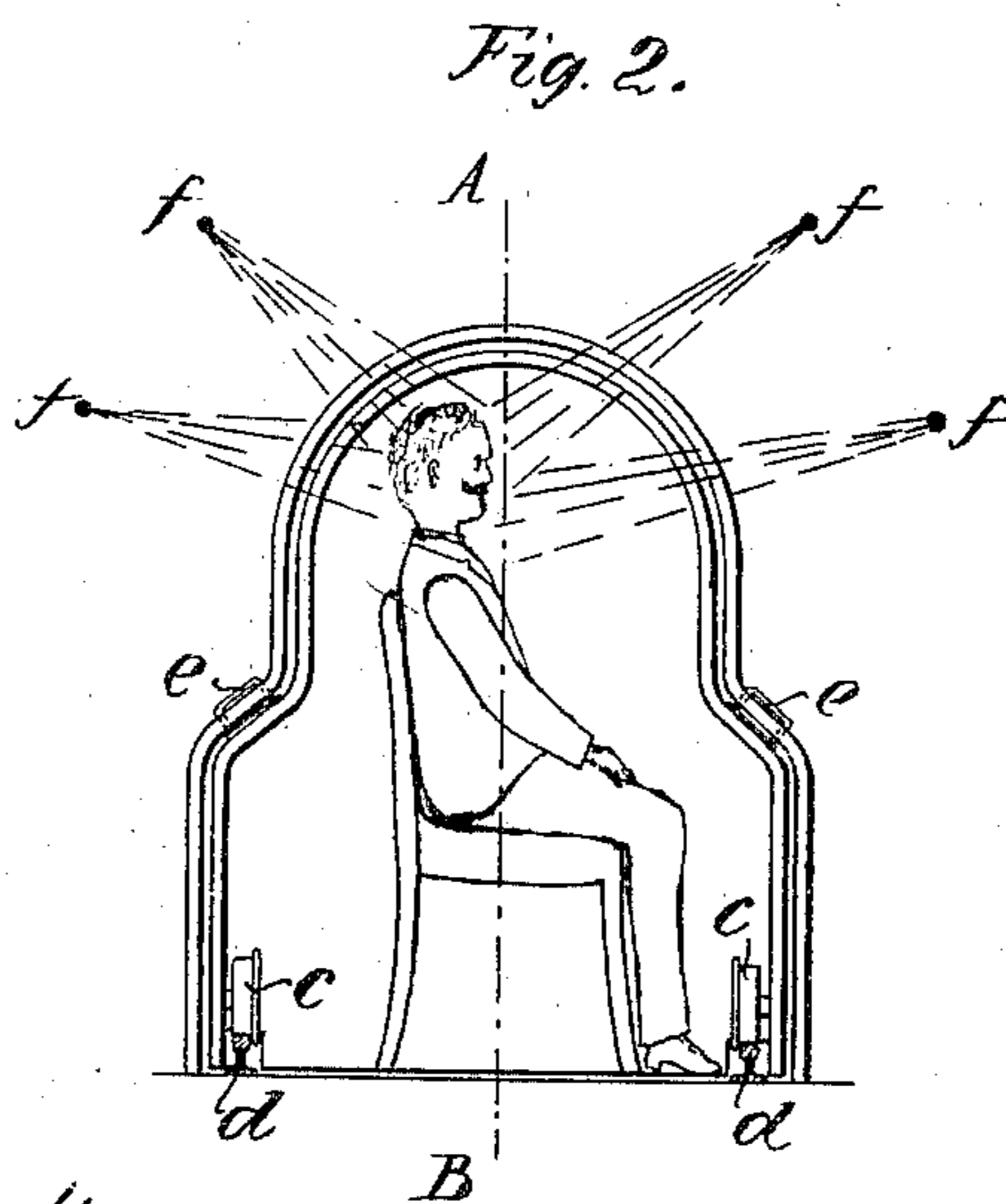
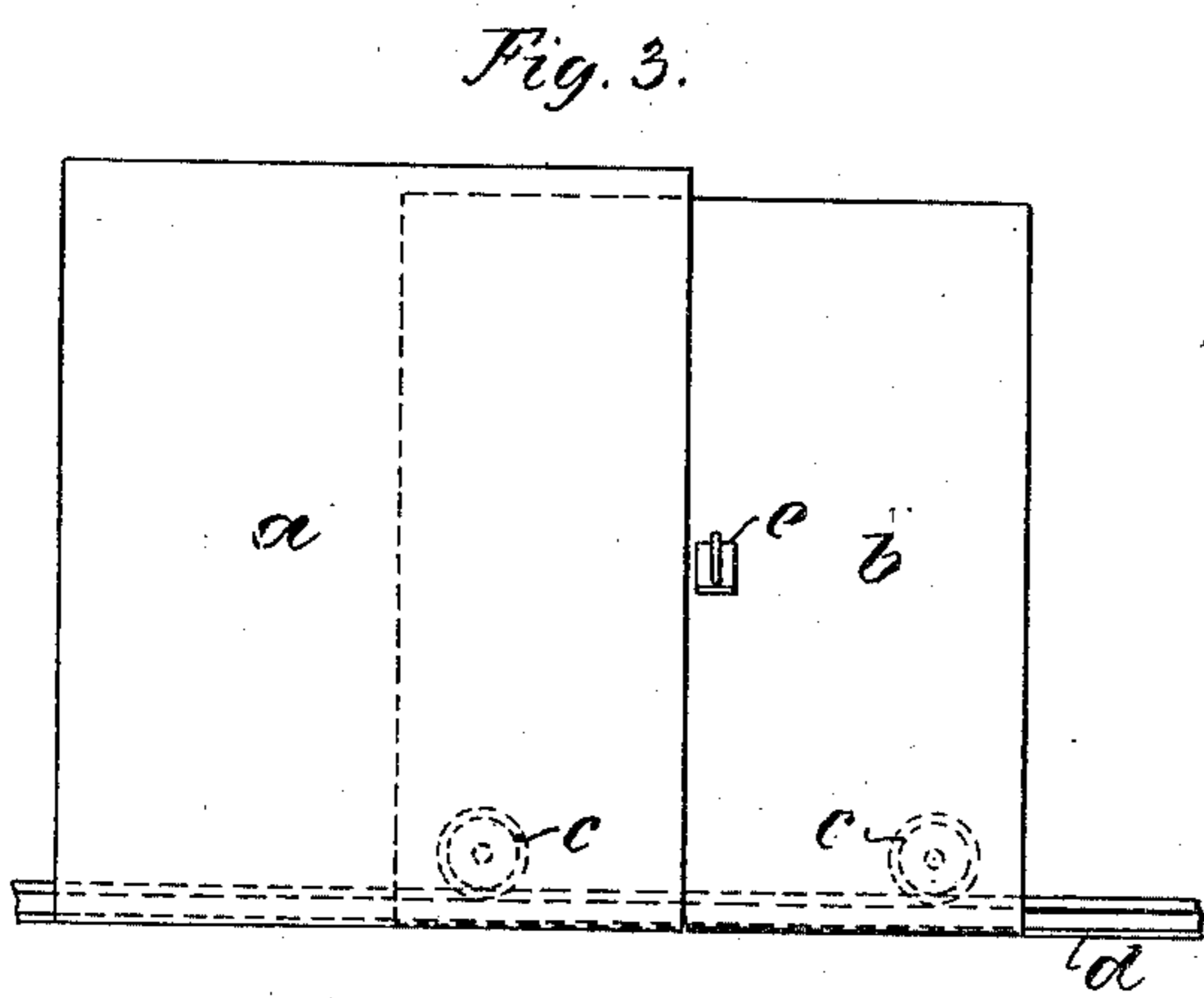
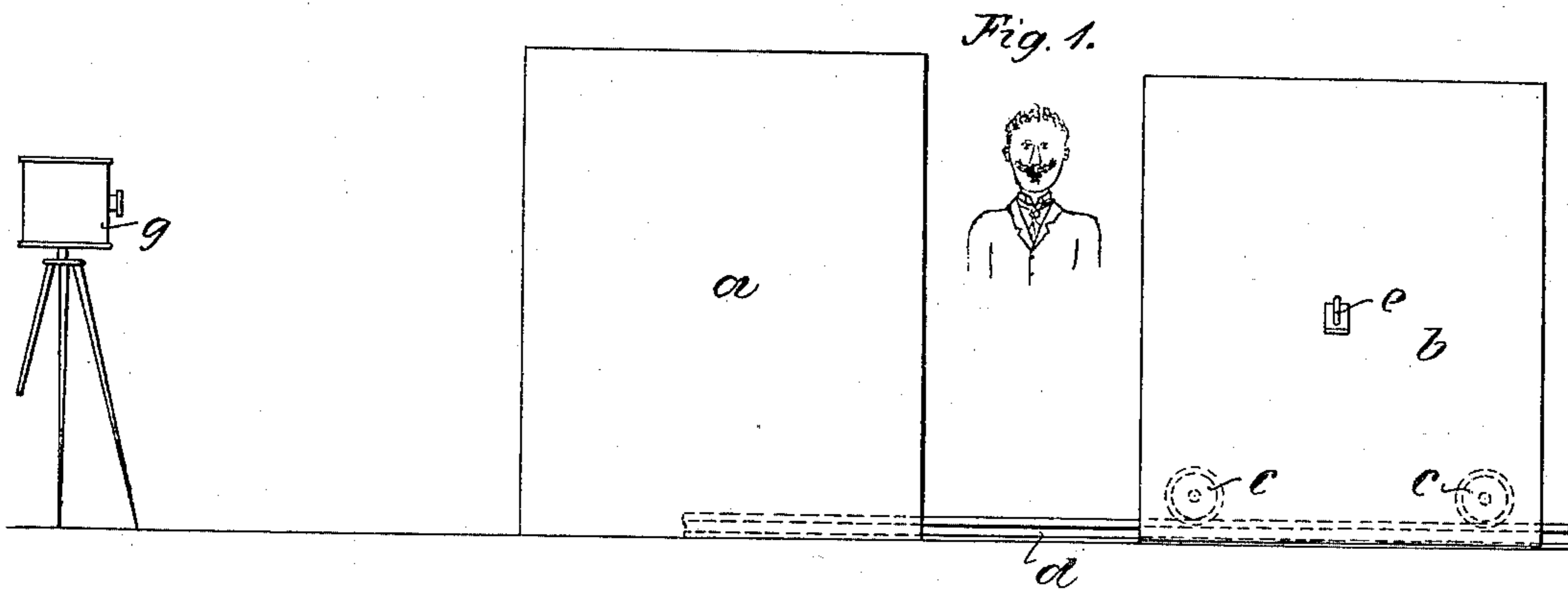
Patented Aug. 12, 1902.

W. OHSE.

PROCESS OF PRODUCING PHOTOGRAPHS IN RELIEF.

(Application filed June 1, 1901.)

(No Model.)



Witnesses

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UNITED STATES PATENT OFFICE.

WILHELM OHSE, OF BERLIN, GERMANY.

PROCESS OF PRODUCING PHOTOGRAPHS IN RELIEF.

SPECIFICATION forming part of Letters Patent No. 706,774, dated August 12, 1902.

Application filed June 1, 1901. Serial No. 62,800. (No specimens.)

To all whom it may concern:

Be it known that I, WILHELM OHSE, a subject of the German Emperor, residing at Berlin, Kingdom of Prussia, and German Empire, have invented certain new and useful Improvements in Processes of Producing Photographs in Relief, of which the following is a specification.

This invention relates to a process for the manufacture of rilievo-work in metal, celluloid, gypsum, or any other kind of suitable material by means of photography; and it is especially intended to produce pictures that will exhibit all the effects of the objects of nature.

The process forming the subject of the present invention is chiefly intended for the reproduction of living objects by means of photography and in the manner known as "rilievo-work."

The accompanying drawings represent an apparatus for carrying my invention into effect.

Figure 1 is a side elevation of the apparatus; Fig. 2, a front elevation; Fig. 3, a side elevation showing it closed; and Fig. 4, a section on line A B, Fig. 2.

My process is based upon the well-known property of layers of gelatin or glue which have been made sensitive to the effects of light by the addition of chromates or bichromates of losing their property to swell up on treatment with water if such layers of glue or gelatin have been previously exposed to the action of the light. If a plate or layer of glue or gelatin treated in this manner is covered by a negative or by a diapositive, then exposed to the action of the light, and finally developed by water or any other suitable solution, those parts which have been protected from the action of the light will swell up, while the parts upon which the light has been allowed to act will refuse to swell up or will only partially swell, according to the degree of exposure to the light. In this manner I am enabled to obtain a rilievo-picture which in this condition already or after a treatment with tanning agents may serve immediately as a matrix for molding or modeling in metal, celluloid, gypsum, or any other suitable material or that may be used for the galvanic process. The higher more elevated parts of

the plastic object to which the photographic process is to be applied are exposed to the action of the light for a longer time than those parts of the object which are depressed or low in relation to the other parts, which is effected by causing the symmetrically and uniformly lighted object to enter continuously into the shade either from the side opposite of the photographic apparatus toward the side facing the photographic apparatus or, inversely, while exposing the object in the photographic camera and in accordance with the time of exposure. The negative picture obtained by this manner of photographic exposure corresponds as regards density of the several parts exactly to the difference in height of the various parts of the plastic object it is desired to reproduce—that is to say, the highest parts of the object which were exposed to the action of light longest of all are the most dense in the negative, while the deeper lower parts which enter into the shade immediately after the commencement of the exposure are the most transparent. Devices for effecting photographic exposures in this manner are constructed on the following principles: The object to be reproduced, a human being for instance, is exposed to the light of a strip or band of light from both sides, the light being thrown directly upon the object the reproduction of which is to be effected, suitable appliances, ground glass, or the like being used to obtain a uniform distribution of the light, which may be of any suitable kind, such as electric incandescent or arc light. On the sides of the object, at the upper end of the same, and all around it and between the object and the sources of light a screen of dense material is placed, which by some suitable contrivance is made to move either from the rear to the front toward the photographic object or in the reverse direction. The duration of exposure in the photographic camera is governed by the time during which the screen has been moving forth and back, which the operator will be able to easily control by means of a suitable mechanical appliance. If the photographic apparatus is opened for the purpose of exposure, the screen moves also, being advanced, for instance. The screen will thereby first throw a shade upon the outlines of the object, these outlines leaving the

weakest impression upon the photographic plate. In the ratio as the screen continues to move the higher parts are shaded until the highest point is reached, which leaves the most intense impression of light on the plate when proceeding in this manner. I may also proceed by causing the shade to move from the camera toward the object and over the latter.

10 In the drawings, *a* represents a fixed section of the screen, and *b* is a movable section supported by rollers *c* upon rails *d*.
e represents handles for opening and closing the screen.

15 *f* is the source of light, and *g* the camera. By means of the above apparatus I am thus enabled to produce a negative plate by a single photographic exposure, the density of the different parts of which is an exact reproduction of the plastic appearance of the object under treatment. This negative or a diapositive obtained therefrom is then used to cover a plate or layer of bichromated gelatin or glue, which is then exposed to the light covered by this negative or diapositive and finally developed. I obtain thereby a rilievo-picture of the photographic picture produced in the first place. The said rilievo-picture, which may be used both as a positive and a negative, is a true representation of the object of which the picture was taken in its natural appearance, and it will produce the same impression upon the observer.

I am aware that pictures in rilievo have been produced by a cinematographic process in which a strong shade is thrown upon an object but faintly lighted and by taking a series of pictures in rapid succession of the object while the relative positions of the object and of the shade were changed. I do not claim this as my invention, which is entirely different from the process referred to, inasmuch as in my invention the object is directly lighted and but one exposure instead of a series of exposures is made of the strongly-lighted object, while a shade is made to advance continuously toward the object until it reaches entirely over said object. I thus obtain different degrees of illumination of the various parts of the object during one single exposure, and these different degrees will be

exactly reproduced upon the sensitive plate upon which the picture is taken, and in accordance therewith the sensitized layer which is used for printing from the negative picture thus obtained will be influenced differently in its various parts, according to the different degrees of illumination to which the corresponding parts of the negative have been exposed. It is obvious, therefore, that while in the previous process referred to the sensitized layer has to be exposed successively to a whole series of different negatives in my invention I am enabled to obtain a solid rilievo-picture upon the sensitized layer by but one negative and by but one operation. Besides, since the object has been strongly lighted it is evident that very sharp and definite outlines may be obtained, which was not possible before my invention.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. The process of producing a picture in rilievo by photography, which consists in throwing a strong light upon the object to be reproduced, placing the object opposite a photographic camera, and causing a shade to gradually reach over the object in the axis of the photographic apparatus while but a single exposure is made, substantially as specified.

2. The process for producing a picture in rilievo by photography, which consists in first throwing a strong light upon the object to be reproduced, exposing the object to a sensitive plate, then covering the object gradually by a shade while but a single exposure is made, the position of the shade relatively to the sensitive plate and to the object being changed gradually during exposure, and finally covering a layer of sensitized gelatin with the picture produced upon the said sensitive plate and then developing said sensitized layer to form a solid rilievo-picture, substantially as specified.

In witness whereof I have hereunto signed my name, this 15th day of May, 1901, in the presence of two subscribing witnesses.

WILHELM OHSE.

Witnesses:

HENRY HASPER,
 WOLDEMAR HAUPT.