

No 1139



A.D. 1901

*Date of Application, 17th Jan., 1901*

*Complete Specification Left, 26th Sept., 1901 - Accepted, 2nd Nov., 1901*

PROVISIONAL SPECIFICATION.

“Improvements in Enlarging or like Cameras”.

I, JULES CARPENTER of 20 Rue Delambre, Paris, France, Mechanical Engineer, do hereby declare the nature of this invention to be as follows:—

Photographic negatives of high buildings generally suffer from distortion, the vertical lines converging upwards. This distortion can be corrected if instead of printing the positive in the usual manner, the positive is produced in a camera analogous to an enlarging camera but provided with means for varying simultaneously the inclination of the negative and of the sensitised surface to the optical axis of the lens.

I have investigated the law which governs the correlation between the inclination of the plane of the negative and of that of the sensitised surface to the optical axis of the lens in a camera of the kind referred to, and I find that the relationship is this:—If the two planes are sufficiently prolonged they must intersect in the plane perpendicular to the said axis and passing through the optical centre of the lens.

My invention relates to the construction of cameras for rectifying the aforesaid photographic distortion and is applicable either to enlarging cameras or to any other cameras constructed on the same principle. The invention consists in providing means for inclining the frames at the front and back of the camera, for holding the negative and sensitised surface respectively, to the optical axis of the lens in accordance with the law explained above. I prefer to construct the camera in such manner that the two inclinations are obtained by the same movement, such as by turning a spindle.

There are several ways by which I may attain this object. For example, I pivot the front and back frames of an enlarging camera each on a vertical axis, and fix to the base of each, at right angles to the plane of the plate or the like in the frame, a rigid bar longitudinally slotted at its free end to receive a pin which passes through both slots and is attached to a sliding piece on the base of the camera. When the sliding piece is moved by a screw spindle or rack and pinion, the frames are turned simultaneously through angles the ratio between which depends on the distance of the pin from the centres of rotation, and is determined firstly by the degree of enlargement to be effected by the camera and secondly by the law aforesaid.

When there is no enlargement the angles through which the frames turn are the same. In this case I attach to each frame a nut in one of which engages a right hand and in the other a left hand screw thread, both threads being on the same spindle and of pitch determined by the law. If this method is adopted for the enlarging camera the threads must be of different pitch.

Dated this 17th day of January 1901.

ABEL & IMRAY,  
Agents for the Applicant.

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*Carpentier's Improvements in Enlarging or like Cameras.*


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## COMPLETE SPECIFICATION.

## “ Improvements in Enlarging or like Cameras. ”

I, JULES CARPENTIER, of 20 Rue Delambre, Paris, France, Mechanical Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement: —

Photographic negatives of high buildings generally suffer from distortion, the vertical lines converging upwards. This distortion can be corrected if instead of printing the positive in the usual manner, the positive is produced in a camera analogous to an enlarging camera but provided with means for varying simultaneously the inclination of the negative and of the sensitised surface to the optical axis of the lens. I have investigated the law which governs the correlation between the inclination of the plane of the negative and of that of the sensitised surface to the optical axis of the lens in a camera of the kind referred to, and I find that the relationship is this:—If the two planes are sufficiently prolonged they must intersect in the plane perpendicular to the said axis and passing through the optical centre of the lens.

My invention relates to the construction of cameras for rectifying the aforesaid photographic distortion and is applicable either to enlarging cameras or to any other cameras constructed on the same principle. The invention consists in providing means for inclining the frames at the front and back of the camera, for holding the negative and sensitised surface respectively, to the optical axis of the lens in accordance with the law explained above. I prefer to construct the camera in such manner that the two inclinations are obtained by the same movement, such as by turning a spindle.

There are several ways in which I may practically carry out my invention which, however, consists rather in method of rectification which I have discovered than in any particular apparatus by which it can be practised. I shall however describe by way of example, two arrangements shewn in the accompanying drawings.

Fig. 1 is a vertical section and Fig. 2 is a sectional plan of one such arrangement.

Fig. 3 is a diagram shewing the relation of the planes of the negative and the copy.

Fig. 4 is a vertical section Fig. 5 is a plan and Fig. 6 is an end view of a modified arrangement.

Referring first to Figs. 1, 2 and 3 which shews apparatus by which the photograph can be enlarged. The front frame carrying the negative  $d$  is pivotted at  $a$ , the rear frame carrying the sensitised surface to receive the print is pivotted at  $b$ . These frames are connected by bellows excluding light to the frame carrying the objective having the optical centre at  $c$ . To the two pivotted frames I attach arms  $e, f$  perpendicular to them respectively, and having slotted holes  $h$  engaging a pin  $g$  projecting from a transverse slide which can be moved by a screw  $j$ .

If the centre line  $c'$  of the transverse slide be at the same distance from  $b$  as  $c$  is from  $a$  then, as appears from the diagram Fig. 3, when the perpendiculars  $a d'$  and  $b d'$  meet at  $d'$  in the perpendiculars  $d' c'$ , the planes  $a d$  and  $b d$  meet at  $d$  in the perpendicular  $d c$ .

As shewn in Figs. 4, 5 and 6 which shews a camera suited for copying on the same scale as the negative, the frames pivotted respectively at  $a$  and  $b$  have lugs in which can turn nuts  $l$  through which pass the right and left threads

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*Carpentier's Improvements in Enlarging or like Cameras.*

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of a spindle  $k$  which has at  $m$  a collar revolving in a stationary lug so that it cannot move lengthwise.

By turning the spindle  $k$  the two end frames are moved through equal angles so that their planes if produced would meet in the produced middle plane. This apparatus might be modified for effecting copies of scale different from that of the negative by moving the lens from the middle towards either end and making the two threads of the spindle  $k$  screws of different pitch so as to turn the one frame more than the other.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

1. In an enlarging or like camera pivoting the frames that carry respectively the negative and the sensitised surface and connecting them in such a way that both turn on their pivots to relative positions such that the planes of the two surfaces if produced would meet in a plane perpendicular to the optical axis and passing through the optical centre of the lens, substantially as and for the purpose set forth.

2. In combination with the two pivoted frames their perpendicular arms meeting at the sliding pin and moved by a transverse screw substantially as described with reference to Figs. 1 and 2.

3. The modified arrangement wherein the frames are moved on their pivots by right and left threads on a screw spindle substantially as described with reference to Figs. 4, 5 and 6.

Dated this 26th day of September 1901.

ABEL & IMRAY,  
Agents for the Applicant.

Fig. 1.

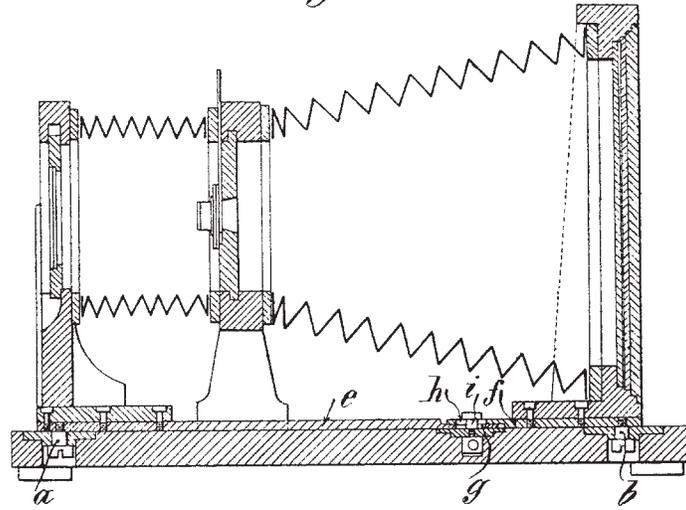


Fig. 2.

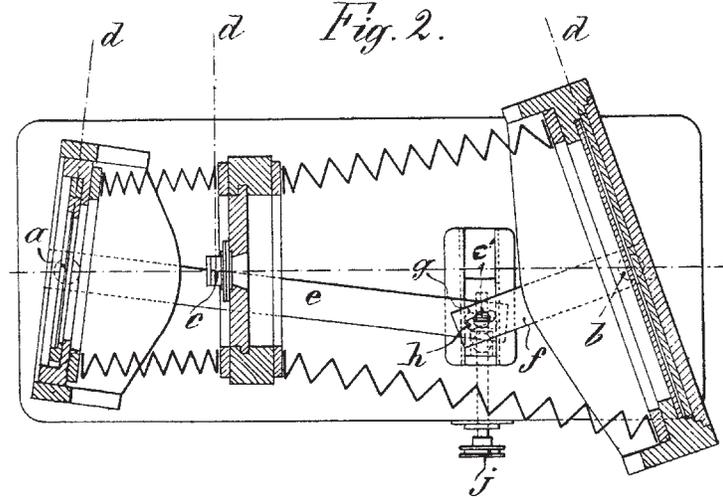


Fig. 4.

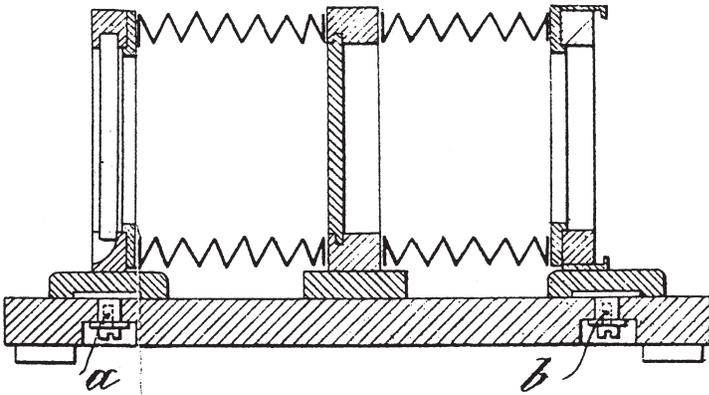


Fig. 6.

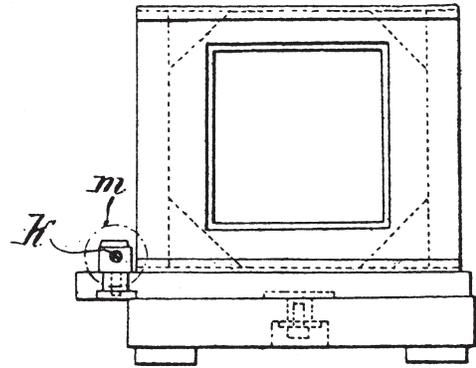


Fig. 5.

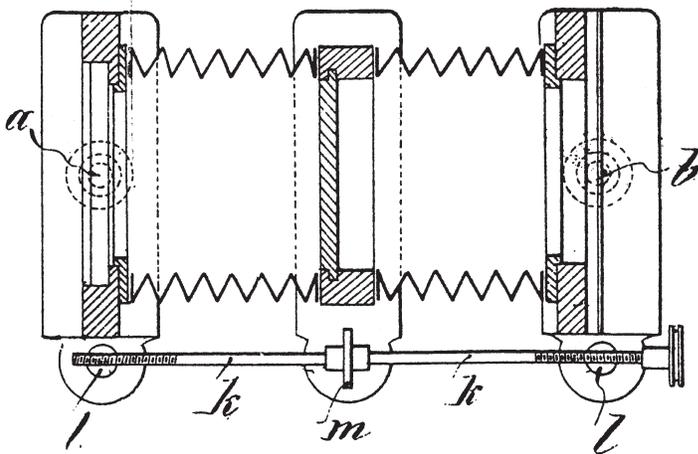


Fig. 3.

