

PATENT SPECIFICATION

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(54) CAMERA FOR STEREOPHOTOGRAPHY

(71) We, DIMENSIONAL DEVELOPMENT CORPORATION, a corporation organised under the laws of the State of Georgia, United States of America, of 2403 Johnson Ferry Road NE, Atlanta, Georgia 30341, United States of America, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the production of stereoscopic pictures of the type employing a lenticular screen, and in particular relates to a camera for the production of such pictures. The invention represents an improvement in or modification of the invention described in our Application No. 48178/75 (Specification No. 1,445,585), hereinafter referred to as the "parent specification" and which itself is divided from Application No. 45325/73, Specification No. 1,445,583).

Our parent specification describes and claims a camera for taking a plurality N of two-dimensional views of an object field for use in composing a stereoscopic picture of the type incorporating a viewing lenticular screen of lenticule width W, the camera including corresponding pluralities N of lenses and associated film frames, the lenses being aligned in a row with their optical axes substantially equidistantly spaced apart and substantially in parallel; the distance T between the optical axes of the endmost lenses being related to predetermined values of $X_{T'}$, R, f, a and b generally in accordance with:

$$T = \frac{X_{T'} \cdot ab}{Rf(b-a)}$$

Successful production of stereoscopic pictures with such a camera is thus determined by relating the distance between the optical axes of the endmost lenses to various parameters; $X_{T'}$, a, b, R, and f, the definitions of which are given in the parent specification, and to which the reader is referred. Of these parameters, $X_{T'}$ (the "parallax value")

is an important variable and can be related to the lenticule width, W, to N, and to a variable c. The variable c is the "shift factor" which equals the number of lenticules or fractions thereof shifted between frames.

In a preferred aspect of the invention claimed in the parent specification, the predetermined value of $X_{T'}$ is within the range of from substantially $2W(N-1)$ to substantially $2cW(N-1)$, wherein c is selected within the range of from 1.0 to 5.0 inclusive, as a function of photographic conditions.

The maximum value of c suitable for any given set of photographic conditions, while not dependent entirely thereon, has been found to be significantly influenced by the lenticule width W of the viewing screen. Specifically, smaller values of W generally allow the use of larger values of c. This is because as W gets smaller, and particularly as it approaches a fineness at which it is imperceptible, or appreciably so, to the eye, the effect of skipped lenticule on image quality, described in the parent specification in connection with Figures 4 and 5 therein, is not nearly as pronounced as with larger lenticules. Experiments showed that c values of up to 5.0 are generally useful with all commonly used lenticule widths, $W=0.48$ mm, depending upon the other factors of object image size, contrast, etc.

However, we have now found that c values in excess of 5.0 and as high as 10.0, may be safely used with extra narrow or fine lenticule widths on the order of 5.0 mils (0.125 mm) or less. It will be appreciated that 5.0 mils is not an absolute limit of W beyond which c values of greater than 5.0 cannot be used, but that, as a general rule, higher quality pictures will be obtained if c values of greater than 5.0 are restricted to use with such lenticule widths, that is to say, to lenticular widths of 5.0 mils or under.

As an example of the selection of c for a common lenticule width, say 0.48 mm, if the images of the object photographed are small in comparison to the lenticule width W of the lenticular screen (e.g. 10W or less) and/or a high contrast picture (e.g. between

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the key subject matter and background) is desired, c may lie between 1 and 3. However, when the images of the objects photographed are large in comparison to the lenticule width W and/or the resulting picture is to be of low contrast, c may range from 3 to 5.

For a W of 5.0 mils or less, it has been found that c values as high as 10.0 are acceptable. For example, pictures of good quality have been obtained with a lenticular width of 5 mils and a c factor of substantially 10. Of course, any lower value of c could be used, and the considerations in respect of lenticule width, contrast, object image size, etc. as given in the parent specification will be understood to operate as constraints in the maximum value of c which may be used. For instance, excellent quality has been obtained with a lenticule width of 3.15 mils and a c factor of approximately 9. Likewise, it will be understood that the maximum permissible shift c might not result in every photographic situation, as the preceding example illustrates. Often, however, it is desirable for other reasons, relief effect, camera lens spacing, etc., to use or closely approach the maximum permissible value.

In accordance with the present invention we therefore provide a camera as claimed in claim 2 of the parent specification wherein additionally W is not substantially greater than 5.0 mils and wherein c is selected from

the range of from 1.0 to 10.0 inclusive (preferably greater than 5.0 and up to 10.0) rather than just from the range 1.0 to 5.0.

The modification to the invention described in the parent specification is an extension or alteration to the values of c and W , and it is hence unnecessary to give further details concerning practice of the invention since the information given in the parent specification will suffice, subject to the variation in c and the use of fine lenticule widths W as specified above.

WHAT WE CLAIM IS:—

1. A camera as claimed in claim 2 of Application No. 48178/75 (Specification No. 1,445,585) wherein, additionally, W is not substantially greater than 5.0 mils, and wherein c is selected from the range of from 1.0 to 10.0.

2. A camera according to claim 1 wherein c is selected from the range of greater than 5.0 and up to 10.0.

3. A camera according to claim 1 and substantially as hereinbefore described.

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