Nov. 13, 1923. 1,473,939

H. M. RUSSELL

CHANGING PICTURE ILLUSION DEVICE

Filed June 21, 1922

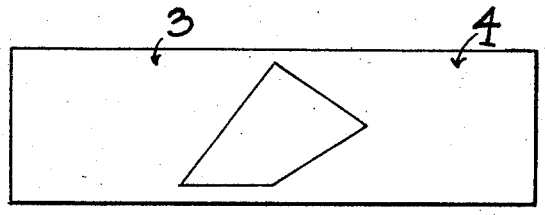


Fig 1.

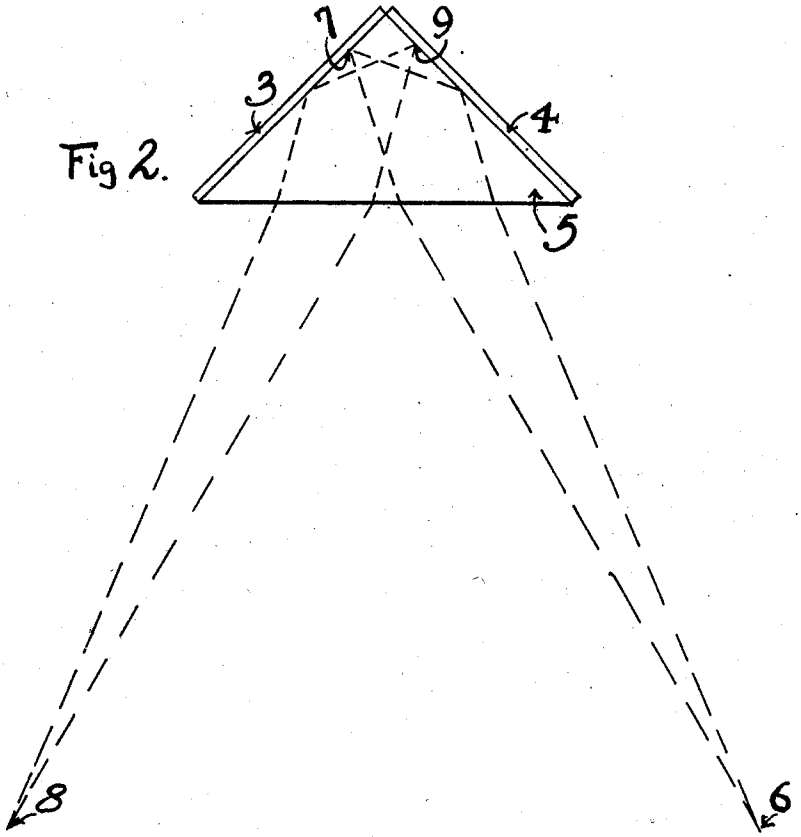


Fig 2.

INVENTOR

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UNITED STATES PATENT OFFICE.

HENRY M. RUSSELL, OF WHEELING, WEST VIRGINIA.

CHANGING-PICTURE ILLUSION DEVICE.

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To all whom it may concern:

Be it known that I, HENRY M. RUSSELL, a citizen of the United States, residing at Wheeling, in the county of Ohio and State of West Virginia, have invented a new and useful Improvement in Changing-Picture Illusion Devices, of which the following is a description.

My invention relates to that class of devices which when viewed from one angle show one picture or figure, and viewed from another angle, show a different picture or figure; one object of my invention is to provide a device of this character in which the respective views will appear well illuminated when the device faces a window, and without other or special illumination. Another object of my invention is to provide a device of the character described, which shall be simple to construct, and not liable to get out of order. Another object is to provide a device, the pictures for which may be printed or photographed by ordinary processes.

I attain these objects by the apparatus illustrated in the accompanying drawings, forming part of this specification, in which—

Figure I is a view of the drawing that forms the basis of the illusion. It consists of two parts joined together along a vertical line of symmetry. As shown in Figure I, the parts are folded back, so that they both appear to lie in the plane of the paper, but in the operative device, they lie at right angles to each other, still, however, joining each other at the said line of symmetry. Figure II is a top view of the complete device. Similar numerals refer to similar parts in the two figures. Numeral 3 refers to the part of the drawing on one side of the said line of symmetry. This part in the device shown, consists of two line segments extending from a common point to the said line of symmetry, one of the said segments being at right angles to, and the other making an angle of approximately 45° with the said line of symmetry. These two lines represent one-half of a triangle, which would be completed by extending the first line to a point an equal distance on the other side of the said line of symmetry, and joining that point with the point at which the oblique lines meet the line of symmetry. The triangle so formed will be approximately one-fourth wider in proportion to its height than is an equilateral triangle which is the figure that I desire to portray. Numeral 4 refers to the part of the drawing on the other side of the said line of symmetry, and consists of two line segments extending obliquely from a common point to the said line of symmetry, and making equal angles therewith. This represents half a lozenge, which would be completed by drawing lines respectively from the points at which the two said oblique lines meet the said line of symmetry, the lines so to be drawn making the same angles with the said line of symmetry as the first-mentioned oblique lines, and meeting in a point. The angles of the two oblique lines shown in Figure I are such that the lozenge, if completed as aforesaid, would be about one-fourth wider in proportion to its height than is the lozenge commonly used to represent a diamond on a playing card, which is the shape that I desire to portray. Numeral 5 is a right angle prism of transparent glass, the rectangular faces of which are as nearly plane faces as practicable, and are polished. The drawing is attached to the prism in such a position that the said line of symmetry shall be in contact with the right angle edge of the said prism between the two equal rectangular faces thereof, and the portion of the said drawing on one side of the said line of symmetry is in contact with one of the said equal rectangular faces, and the portion of the said drawing on the other side of the said line of symmetry is in contact with the other of the said equal rectangular faces.

The operation of the device is as follows: Observed from a position at the right of the plane of symmetry, as point 6, any point on 3, for example, 7, will be seen by the observer, but because his line of vision makes an angle greater than 47° with the inside surface of the right-hand leg face of the prism 5, the observer will not be able to see any part of picture 4 because of total reflection, but will see a second image of point 7. This will be true of all points in the half picture, and the two half images will appear as a complete triangle. A similar situation will prevail when the observer is at a point to the left of the plane of symmetry, as point 8. Here, he will see no part of half picture 3, but will see two images of each point of half picture 4, as for example, point 9, and he will, therefore, see a complete lozenge. Owing to the differences between the distances which light

from different points must travel before being refracted by the front face of the prism, each part of the observed virtual image which the observer seems to see is narrower than the corresponding part of the actual half picture. I, therefore, make the half picture preferably one-fourth to one-third wider in proportion to its height than is the object that I wish to portray. In the device illustrated, the lozenge would appear as a square, and the triangle would appear an equilateral triangle. In order that the picture shall appear complete when viewed from different angles, and that at the same time each half picture shall never be visible except through one face of the prism, it is necessary to have the half pictures substantially in contact with the faces of the prism. I find that this does not interfere with the total reflection, provided no cement is used at any point at which total reflection is desired.

I claim:

1. In a changing picture illusion device, the combination of a triangular prism of transparent material having one of its angles approximately a right angle, a picture representing one half of a symmetrical subject behind and substantially in contact with one of the sides of said prism adjacent to said approximate right angle, and a picture representing one half of a different symmetrical subject behind and substantially in contact with the other side adjacent to the said approximate right angle, each of the said half pictures being so drawn that the ratio of horizontal to vertical dimensions shall be approximately one-fourth to one-third greater than the ratio of the horizontal to the vertical dimensions of the object represented.

2. In a changing picture illusion device, the combination of a triangular prism of transparent material having one of its angles approximately a right angle, a picture representing one half of a symmetrical subject behind one of the sides of said prism adjacent to said approximate right angle, and a picture representing one half of a different symmetrical subject behind the other side adjacent to the said approximate right angle, the said pictures being in contact with the said sides of the prism.

3. In a changing picture illusion device, the combination of a triangular prism of transparent glass having one of its angles approximately a right angle, a picture behind and substantially in contact with one of the sides of said prism adjacent to said approximate right angle, representing one half of a symmetrical object in one stage of an evolution, and a picture behind and substantially in contact with the other face of said prism adjacent to said approximate right angle, representing the object in another stage of the evolution.

4. In a changing picture illusion device, the combination of a triangular prism of transparent glass having one of its angles approximately a right angle, a picture behind and substantially in contact with one of the sides of said prism adjacent to said approximate right angle, representing one half of a symmetrical object in one stage of an evolution, and a picture behind and substantially in contact with the other face of said prism adjacent to said approximate right angle, representing the object in another stage of the evolution, the said pictures being so located that any two points on the respective pictures representing a part of the said object, which part occupies the same apparent position in each of the said stages of the evolution, shall lie in a plane perpendicular to the said right-angle edge of the said prism, and shall be equidistant from the said right angle edge.

HENRY M. RUSSELL.