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J. SEEMANN
AN ARRANGEMENT OF ROTARY SHUTTERS FOR
STEREOPHOTOGRAMMETRIC PLOTTING
Filed Feb. 4, 1941

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2 Sheets-Sheet 1

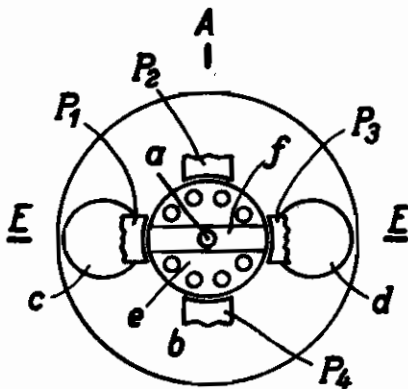


Fig. 1

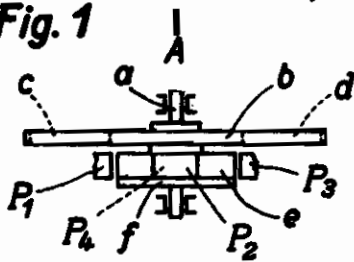


Fig. 2

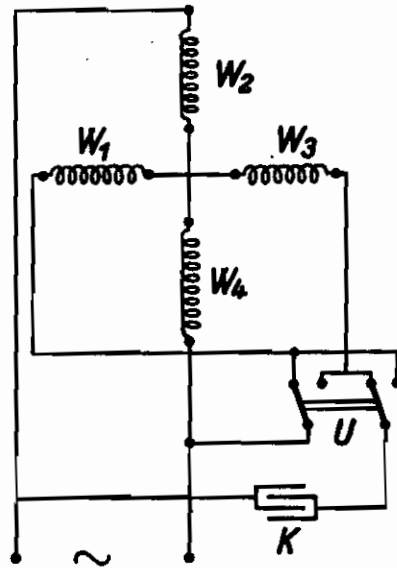


Fig. 3

Inventor:

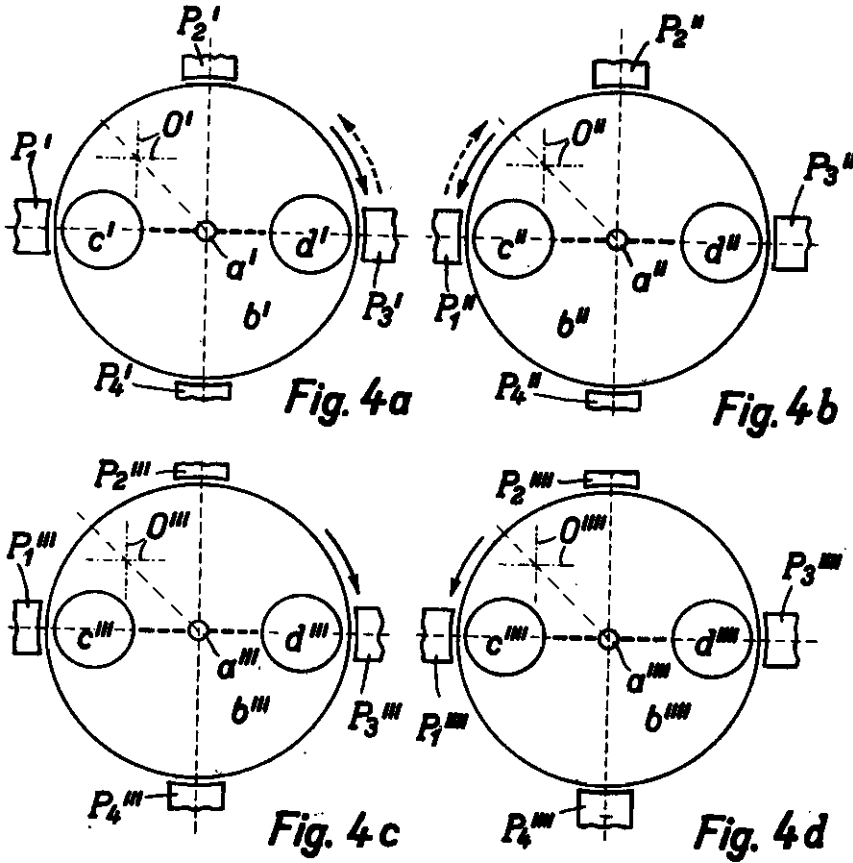
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Inventor:

Johannes Seemann.

ALIEN PROPERTY CUSTODIAN

DEVICE FOR IMPARTING A STEREOSCOPIC IMPRESSION OF PICTURES

Johannes Seemann, Jena, Germany; vested in
the Alien Property Custodian

Application filed February 4, 1941

The invention relates to a device imparting to an observer a spatial impression of stereopictures by projecting same upon a screen with the aid of double or multiple projectors, the device for this purpose containing rotatory stops which are coordinated both to the projectors and to the observer's eyes and driven each by an a. c. synchronous motor whose armature is provided with two pronounced poles in order to make it run in right phase relative to the rotating field.

In accordance with the invention a separate stop is being provided for each projector and each eye, the arrangement being so made that for each stop the axis of the respective projector or eye, respectively, lies in a plane containing the rotation axis of the armature, said plane and the central axis of the pole of the stator lying next to it subtending an angle which is equal to the quotient of a right angle and of the phase number of the stator. This arrangement ensures that the device imparts a stereoscopic effect even if the direction of rotation of the stops coordinated to two projectors or to both eyes is reversed, the effect in question varying from that obtained before the direction of rotation had been reversed (pseudoscopic instead of orthoscopic effect, or vice versa).

It will be expedient to so design the stops that the number of their openings for the passage of light is equal to the phase number of the stator.

The synchronous motors should preferably be of the two-phase hysteresis type whose armature carries a system of permanent magnets which are so constructed and arranged that the armature will have two pronounced poles thus ensuring that the armature will run in right phase relative to the rotating field. Such motors will be of advantage, particularly, if the stops coordinated to the observer are to be worn on his head, in other words, if the weight of the motors is to be as light as possible and the arrangement a compact one. The most suitable type of stop for these motors is one having two openings displaced relatively to each other by 180° whose sizes preferably are to be so chosen that the light and dark periods are equal to one another.

In the annexed drawing a diagrammatic view is given of a device, according to the invention, for a double projection apparatus for the projection of stereopictures upon a screen. Figs. 1 and 2 represent views of a stop connected with the armature of a hysteresis motor. Fig. 3 is a wiring diagram of said motor. Figs. 4 a to d illustrate the four stops of the device in their

relative adjustment at one and the same point of time.

Fixedly connected to a shaft *a* is a disc *b* which contains two circular openings *c* and *d* displaced by 180° , whose axes are equidistant from the axis of the shaft *a* and whose diameters amount to about $\pi/8$ times of the distance apart of the axes of the openings. Furthermore fixedly connected to shaft *a* is the armature *e* of a two-phase hysteresis motor. On the front surface of the armature *e* facing away from disc *b* a rod magnet *f* is so attached that its central axis (figuring from pole to pole) coincides with the plane E—E containing the axes of the two openings. The stator of the motor has four fixed poles *P*₁, *P*₂, *P*₃ and *P*₄. The respective windings are *W*₁, *W*₂, *W*₃ and *W*₄. The letter *K* designates a condenser and the letter *U* a change-over switch controlling the direction of revolution of the rotating field thus making it possible thereby to change the direction of rotation of the armature *e*. Each of the stop discs *b'* (Fig. 4a) and *b''* (Fig. 4b) for the left or right projector of the double projection apparatus, respectively, is to be imagined to be disposed on the respective projector in such a manner that, of the two disc-stops when running synchronously and in right phase about the axis of the respective shaft *a'* or *a''*, respectively, only the axis of a single opening (*c'* or *d'* or *c''* or *d''*) can at a time, when rotating in the (opposing) directions indicated by the fully drawn-out arrows, coincide with the axis of the projector illustrated in the drawing by the intersecting point of a coordinate system of axes *o'*, or *o''*, respectively. Thereby, the position of each projector axis relative to the poles of the respective stator is such that the plane determined by the projector axis and by the axis of the respective shaft *a'*, or *a''*, respectively, bisects that respective angle which is formed by the centered axes of the poles *P*_{1'} and *P*_{2'}, and *P*_{1''} and *P*_{2''}, respectively, lying nearest to said plane. The stop-discs *b'''* (Fig. 4c) and *b''''* (Fig. 4d) for the left and the right eye of the observer are to be imagined to be so mounted on a spectacle frame worn by the observer that, of the two disc-stops, when running synchronously and in right phase about the axis of the respective shaft *a'''* or *a''''*, respectively, in the (opposing) directions indicated by drawn-out arrows, only the axis of a single opening (*c'''* or *d'''* or *c''''* or *d''''*) can coincide at a time, with the axis of the eye illustrated in the drawing by the intersecting point of a coordinate system of axes *O'''* or *O''''*, respectively. Thereby, the position

of each eye-axis relative to the poles of the respective stator is such that the plane determined by the eye-axis and by the axis of the respective shaft a''' or a'''' , respectively, bisects the angle subtended by the central axes of the poles P_1''' and P_2''' , or P_1'''' and P_2'''' lying nearest to said plane.

With the stop discs b' , b'' , b''' and b'''' rotating synchronously and in accordance with the arrows represented by drawn-out lines, a spatial image true in depth is being presented to the observer. A rotation of this kind makes sure that at every point of time belonging to that respective position of the stop discs when the latter are displaced by 45° from the position shown in the

drawing, the light of the left projector enters the left eye, while at every point of time belonging to that respective position of the stop discs when the latter are displaced by 225° from the position shown in the drawing, the light of the right projector enters the right eye. If the spatial image to be presented is to be reversed in depth, the sense of rotation of the stop discs b' and b'' coordinated to the projectors requires to be reversed so that those arrows indicated by broken lines will apply. In this case only the light of the left projector can enter the right eye and the light of the right projector the left eye of the observer.

JOHANNES SEEMANN.