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T. A. BROMBACH
ORTHOPTIC TRAINING DEVICE

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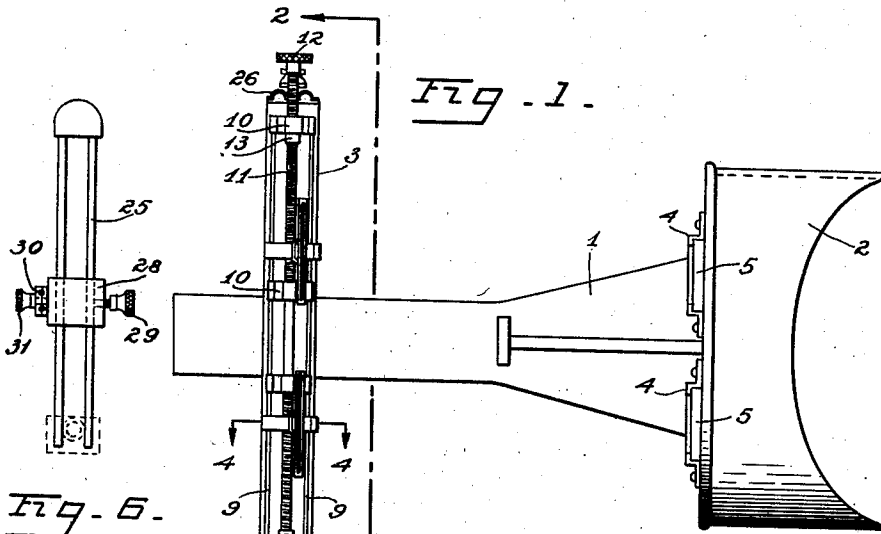
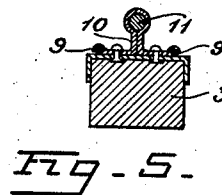
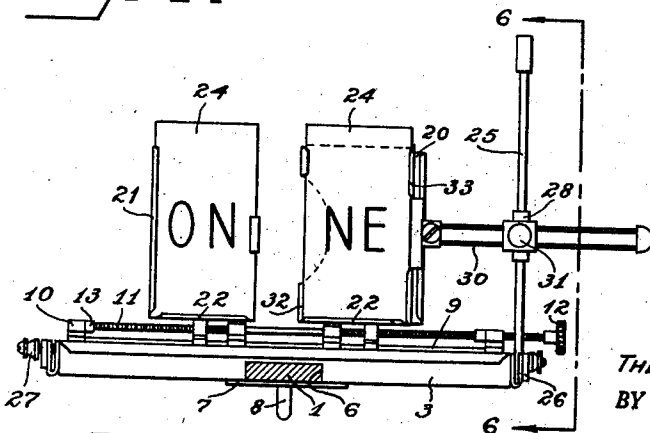
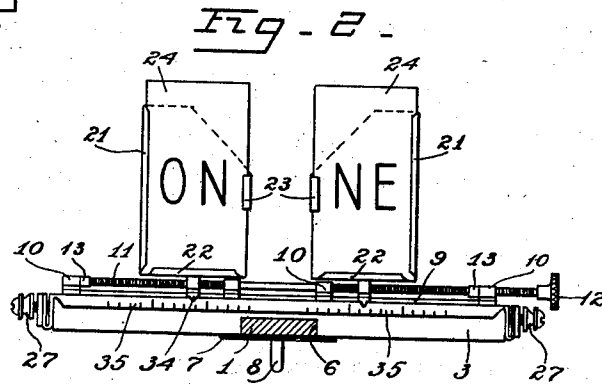
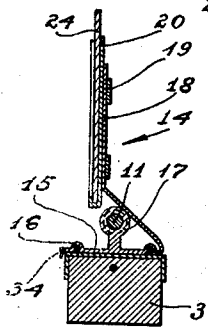


Fig. 6.



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UNITED STATES PATENT OFFICE

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ORTHOPTIC TRAINING DEVICE

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3 Claims. (Cl. 88—20)

The training or curing of strabismus and heterophoria has been limited with the instruments and techniques available and since the treatment is part psychological, as well as physiological, it is essential to have a sufficient variety and novelty to maintain the patient's interest. Furthermore, since the work is to break up the fault of habitual improper placement, it is best accomplished by a method that is easily and frequently used.

The majority of the work need not necessarily be done directly under the observation of a trained technician and therefore the device should be such as to be useable at intervals during the patient's routine daily life.

The principal object of my invention is to make use of a stereoscope with certain attachments and apply this to the problem of orthoptic training. The use of such a device should result in an early neuro-biotaxis for the promotion of a proper fusion faculty which is generally accepted to be the foundation of fusion and binocular single vision.

The attachment used with the stereoscope can be adjusted for correcting the fault of one eye or both eyes.

Other objects and advantages will appear as the specification proceeds, and the novel features of the device will be particularly pointed out in the claims hereto annexed.

My invention is illustrated in the accompanying drawing, in which

Figure 1 is a top plan view of the device;
Figure 2 is a section along the line 2—2 of Figure 1;

Figure 3 is a similar section to Figure 2, but shows an attachment in addition to the ones shown in Figure 2;

Figure 4 is a section along the line 4—4 of Figure 1;

Figure 5 is a section along the line 5—5 of Figure 1, and

Figure 6 is a section along the line 6—6 of Figure 3.

In carrying out my invention I make use of a stereoscope which comprises a supporting member 1, an eye shield 2, and a movable carriage 3. In front of the fixed lenses usually provided in the stereoscope I provide brackets 4 for removably holding auxiliary lenses or prisms 5. These lenses or prisms can be changed at will.

The carriage 3 is clearly shown in Figures 1 and 2 and has a recess 6 for slidably receiving a portion of the support 1. A strip 7 is secured to the underside of the carriage 3 and carries a

handle 8 by means of which the carriage is moved.

Upon the carriage 3 I dispose guide rails 9—9 and these are held in position by clamping members 10. There are four clamping members and each acts as a bearing for a screw shaft 11. The shaft 11 has a turning knob 12 disposed at one end and is provided with enlarged portions 13 that bear against the inner faces of the end bearings so as to prevent longitudinal movement of the shaft.

A carrier indicated generally at 14 (see Figure 4) is slidably disposed between two adjacent bearings 10. I show two carriers and since each is identical in structure I will describe one. The carrier has a sliding shoe 15 with portions 16 bent over the guide rails 9 and with a threaded sleeve 17 designed to receive the threaded shaft 11. The threads on the shaft 11 are formed in opposite directions so that a turning of the shaft will move the carriers away from each other and a reverse movement will move the carriers toward each other.

The shoe 15 of each carrier has an upstanding member 18 that is removably received in eyelets 19 struck up from a card supporting member 20. The shape of the card supporting member 20 is shown in Figure 2 and it will be noted that inwardly extending flanges 21, 22 and 23 are provided on three sides of the card supporting member. A card 24 is insertable between the flanges and the back of the card carrier and this card may have any character printed thereon for the purpose desired. As an example I have shown the left-hand card in Figure 2 as having the letters "O N" printed thereon, while the right-hand card has the letters "N E" printed thereon. The patient in using the device adjusts the carriage 3 and then manipulates the knob 12 for moving the cards 24 toward or away from each other until the letters "N" of both cards appear to be superimposed upon each other, and the patient sees the word "ONE". The card carriers 20 are adjustable vertically on the uprights 18.

If the patient desires to move only one of the cards 24 while holding the other stationary an attachment shown in Figure 3 may be used. This attachment consists of a U-shaped upright 25, the legs of which are removably clamped in position by a clamping member 26 shown in Figures 1 and 3. A set screw 27 is used for causing the clamping member 26 to engage with the upright 25. On the upright 25 I slidably dispose a block 28 and a set screw 29 is used for adjustably securing the block 28 in the desired position. A

second U-shaped member 30 is slidably carried by the block 28 and is movable in a horizontal plane. A set screw 31 is used for locking the member 30 in position. The member 30 supports a card holder 32 which has flanges 33 for holding a card (Fig. 3) in position. The card supported by the holder 32 is adjusted in the desired position and is held in this position while the card holder 20 supporting the other card is slowly moved by means of the knob 12. In this way one eye is verged while the other eye is focused upon a fixed card. The attachment for holding the stationary card may be secured to either end of the carriage 3 because I have shown a clamp 26 disposed at both ends.

From the foregoing description of the various parts of the device the operation thereof may be readily understood.

The shoes 15 carry pointers 34 which move over scales 35 and in this way the operator can keep check as to the improvements resulting from the exercises. The purpose of the device is to teach the eyes the habit of pointing to the thing being focused. Eye troubles subject to correction by this device fall under various heads, which are as follows:

1. Esophoria: Tendency of eyes to turn in.
2. Esotropia: Actual turning in of the eyes.
3. Exophoria: Tendency of eyes to turn out.
4. Exotropia: Actual turning out of the eyes.
5. Hyperphoria: Tendency of one eye to turn up.
6. Hypertropia: Actual turning up of one eye.
7. Hypophoria: Tendency of one eye to turn down.
8. Hypotropia: Actual turning down of one eye.

For correcting the first two cases the cards are moved out after the patient has focused the cards and this movement is made slow by the turning of the knob 12 and the patient tries to keep the combined pictures in their proper relation one to the other as long as possible. In cases 3 and 4 the cards 24 are moved toward each other. In cases 5 and 6 the attachment shown in Figure 3 is used and the card holder 32 is moved vertically in a downward direction, while in cases 7 and 8 the card holder 32 is moved upwardly. Of course in cases 5 to 8 inclusive the card holder 32 is placed on the same side of the carriage 3 as the faulty eye. Very often only one eye manifests the squint and either moves out or in, with respect to the other eye. In this case the card holder 32 is used for the good eye and the moving card holder 24 is used for the faulty eye.

The principal advantage of the device lies in the fact that the same focal point is maintained, while the eyes are changed in their positions by the moving of the cards. The distance from the patient to the cards is termed the focal distance.

Although I have shown cards 24 bearing letters, it is obvious that other cards can be substituted which will bear pictures, or numerals. When using pictures one card can have a part of the picture, such as a bird cage, while the other card can have the other part of the picture, such as a bird. The patient tries to combine these two pictures and this aids in impressing on the mind the proper use of the eyes when focusing an object. The card holders can be moved vertically when necessary to account for vertical imbalance in either eye. In cases of amblyopia exanopsia, the free or rapid movement of the card as accomplished with card-holder 33 Fig. 3 will stimulate fixation by using the indirect field of vision to prompt macular perception. In the use of this arrangement one eye holds direct fixation while the other eye follows the moving target.

When using the device before a trained technician the eyes of the patient can be checked by him because they can be observed through the lenses of the stereoscope.

Although I have shown and described one embodiment of my invention it is to be understood that the same is susceptible of various changes and I reserve the right to employ such changes as may come within the scope of the claims hereto annexed.

I claim:

1. An orthoptic training device comprising a frame having eye windows, a carrier adjustably supported by said frame for movement toward and away from the windows, a card holder movable on the carrier, means for gradually moving the holder transversely of the frame, a second card holder having an arm, a second arm supported by the carrier, and means adjustably connecting the two arms together, whereby the second card holder can be adjusted vertically and horizontally.

2. In an orthoptic training device, a card holder, an arm having its end secured to the holder, a second arm extending at right angles to the first, adjustable means connecting the arms together, a carrier, means disposed at each end of the carrier for removably supporting the second arm.

3. In an orthoptic training device, a carrier having a clamp disposed at each end, an arm removably securable to either clamp, a block slidably on the arm, means for securing the block in adjusted position, a second arm slidably carried by the block and extending at right angles to the first arm, means for securing the second arm in adjusted position to the block, and a card holder secured to the second arm.

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