April 9, 1940. R. A. SHERMAN 2,196,906

METHOD AND APPARATUS FOR TESTING EYES

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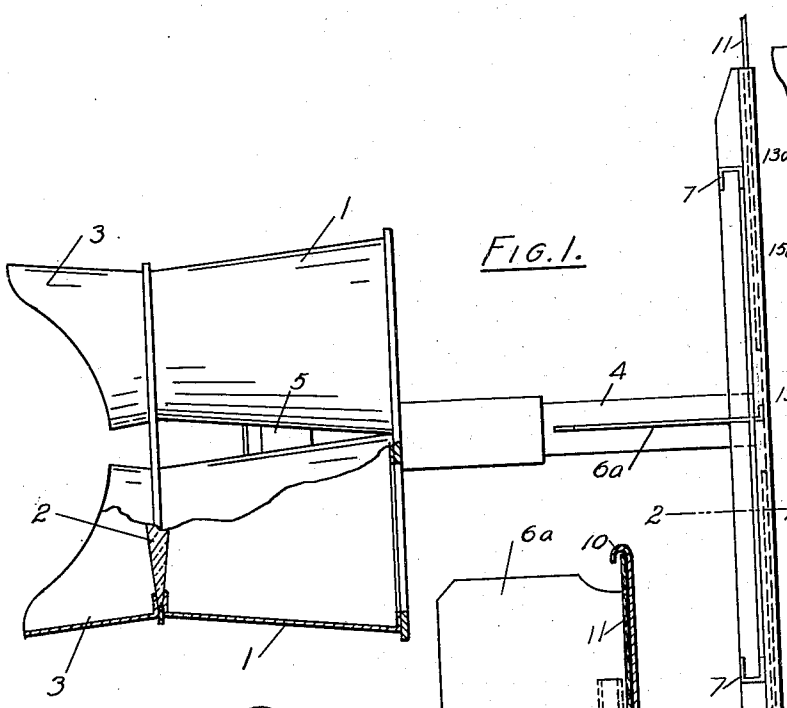


FIG. 1.

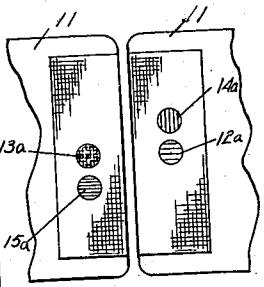


FIG. 7.

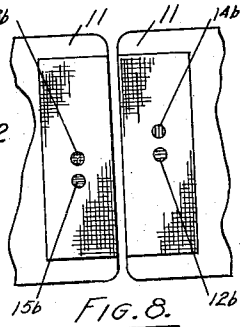


FIG. 8.

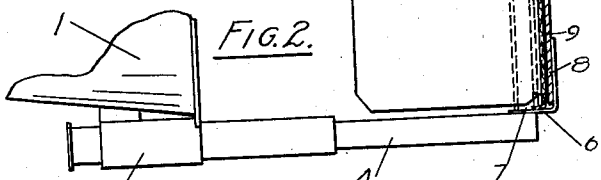


FIG. 2.

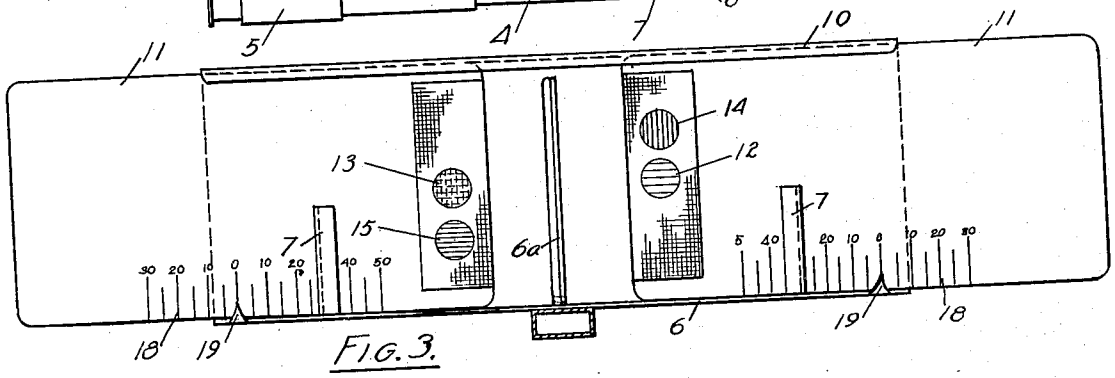


FIG. 3.

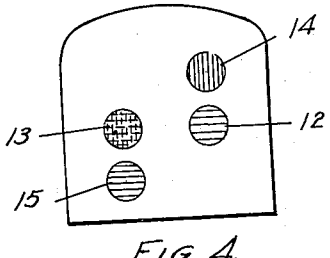


FIG. 4.

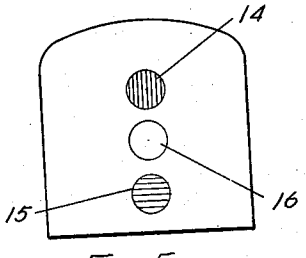


FIG. 5.

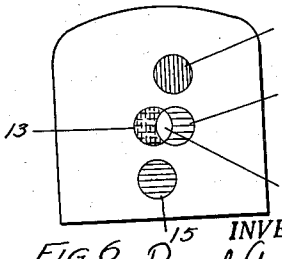


FIG. 6.

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METHOD AND APPARATUS FOR TESTING EYES

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8 Claims. (Cl. 88—20)

This invention is directed to a method and apparatus for gauging a patient's ability as to fusion of the sight responses of both eyes. It affords a simple means where this ability may be measured and readily noted according to a predetermined scale so that the comparative ability of the patient may be ascertained.

In carrying out the invention a stereoscope is used, and targets are positioned on the two fields presented to the eyes in position to be fused if the eyes have the ability to accomplish fusion. Slides in which the targets vary in area are provided and these slides are presented one after the other until a size is reached at which the patient's eyes fail to register fusion. This critcal point is noted and gives the comparative fusion ability of that particular patient. In order to accentuate the presence or absence of fusion it is desirable to present targets of different colors so that a fusion response as to color can be noted as assuring the certainty that fusion has taken place from the report given by the patient.

The invention also contemplates separating the targets to determine the ability of the patient to follow with such separation with fusion. For this reason the targets are made separable and this separation may be checked to a point where fusion is lost and the ability of the patient given a comparative standing in this respect. Features and details of the invention will appear from the specification and claims.

A preferred embodiment of the invention and by which the method may be practiced is illustrated in the accompanying drawing as follows:

Fig. 1 shows a plan view of a stereoscope provided with slides.

Fig. 2 is a side elevation of the same.

Fig. 3 a view of the slides as they appear through the stereoscope.

Fig. 4 shows a view of a slide.

Fig. 5 the fused view as it appears.

Fig. 6 a view in which the slides have separated to a point where complete fusion is lost.

Fig. 7, slides having similar targets to that of Fig. 4 but of a smaller area.

Fig. 8, slides having targets similar to Figs. 4 and 7 but with targets of a smaller area than that of Fig. 7.

The stereoscope has barrels 1, lenses 2, visor 3, a slide 4 carried by a mounting 5 secured to the barrels. These are of common construction. The slide holder has a base plate 6 from which vertical guide plates 7 extend, adapted to receive slides from the top in the usual manner. The plate 6 also carries a guide plate 8 which is spaced from the upright 7 forming a guide space 9 for receiving the slide. The upper end of the plate 8 is turned over at 10 forming a slide groove at the upper edge of the plate so that as a slide 11 is introduced from the sides of the holder it is carried in the space 9 and definitely located and supported by the inturned portion 10. The sight paths leading to the fields are definitely separated by plate 6a carried by the plate 6.

These slides 11, which may be split sdides are provided with targets 12 and 13 oppositely positioned so as to be fused under normal conditions and with the targets 14 and 15, one in each field, which have no companion targets for fusion. In the example shown, the target 12 is a blue-green, the target 13 is yellow, and these fuse to a gray or nearly white. The target 14 may be a red and the target 15 a blue.

The reason for fusing the targets 12 and 14, of fusing colors rather than depending on merely an outlined area, is that in the patient's report as to color the actual existence of fusion can be more definitely checked. The purpose of placing on the same field with each color a target of different color as 14 or 15 is to check with certainty whether both eyes are seeing the target so as to be assured that a lack of fusion does not arise from a failure to see one of the targets.

It has been found that fusion is more readily accomplished with larger areas than smaller areas so that starting with a larger area of fusion targets as in Fig. 4, the patient may be stepped down by a series of graduated slides having graduated dimensions, each slide provided with dimensions of predetermined less area until a slide is reached where there is a failure of response in fusion. This may be termed the critical size or area of fusion with this particular patient and a definite empirical standard is adopted so that these measurements may be readily recorded and the ability of the patient readily compared with normal conditions.

To this method and in this apparatus there may be the added test involved in the separation of the fused targets so as to determine the ability to follow the separation maintaining fusion. This is accomplished by gradually changing separation of the split sides and noting the point where fusion ceases, the slides having a scale 18 acting in relation to pointers 19 on the holder. Thus in Fig. 5 the fused target 16 will continue to appear until the separation is beyond the capacity of the patient to follow it, and the lack of fusion will appear as in Fig. 6, the targets there just failing to over-lap and providing a fused

portion 16a, the rest of the targets carrying their natural colors or shapes.

What I claim as new is:

1. The method of testing fusion ability of the eyes which consists in presenting to the eyes through a stereoscope, slides having on separate fields fusion target areas, and substituting slides having comparative fusion areas, the fusion areas of the different slides being graduated in definitely stepped relation as to dimensions, the relation being such as to some dimensions fusion is achieved and as to some other dimensions fusion is not achieved and noting the dimension where fusion ceases.

2. The method of testing fusion ability of the eyes which consists in presenting to the eyes through a stereoscope, slides having on separate fields differently colored fusion target areas, and substituting slides having comparative fusion areas, the fusion areas of the different slides being graduated in definitely stepped relation as to dimensions, the relation being such as to some dimensions fusion is achieved and as to some other dimensions fusion is not achieved and noting the dimension where fusion ceases.

3. The method of testing fusion ability of the eyes which consists in presenting to the eyes through a stereoscope, slides having on separate fields fusion target areas, and substituting slides having comparative fusion areas, the fusion areas of the different slides being graduated in definitely stepped relation as to dimensions, the relation being such as to some dimensions fusion is achieved and as to some other dimensions fusion is not achieved and noting the dimension where fusion ceases, and varying the distance between the fusion areas to determine the ability while maintaining fusion.

4. The method of testing fusion abiilty of the eyes which consists in presenting to the eyes through a stereoscope slides having on separate fields fusion target areas, and substituting slides having comparative fusion areas, the fusion areas of the different slides being graduated in definitely stepped relation as to dimensions, the relation being such as to some dimensions fusion is achieved and as to some other dimensions fusion is not achieved and noting the dimension where fusion ceases, and providing one field with a non-fusing target area.

5. In an apparatus the combination of a stereoscope having means separating the sight paths to the fields of view, and a plurality of slides presenting pairs of comparative fusion targets, the pairs being graduated in area in a definite stepped relation some slides having targets of areas and spacing adapting them to fuse when viewed and other slides having targets of areas which with the same spacing adapt them to avoid fusion.

6. In an apparatus the combination of a stereoscope having means separating the sight paths to the fields of view, and a plurality of slides presenting pairs of comparative fusion targets differently colored, the pairs being graduated in area in a definite stepped relation some slides having targets of areas and spacing adapting them to fuse when viewed and other slides having targets of areas which with the same spacing adapt them to avoid fusion.

7. In an apparatus the combination of a stereoscope having means separating the sight paths to the fields of view, and a plurality of slides presenting pairs of comparative fusion targets, the pairs being graduated in area in a definite stepped relation, some slides having targets of areas and spacing adapting them to fuse when viewed and other slides having targets of areas which with the same spacing adapt them to avoid fusion, said slides containing on each field non-fusing targets accompanying the fusing targets.

8. In an apparatus the combination of a stereoscope having means separating the sight paths to the fields of view, and a plurality of slides presenting pairs of comparative fusion targets, the pairs being graduated in area in a definite stepped relation some slides having targets of areas and spacing adapting them to fuse when viewed and other slides having targets of areas which with the same spacing adapt them to avoid fusion, the units of the pairs of fusion targets being separable to test the extent of separation with fusion response on the part of the patient.

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