350-286. XR 1800452 SR

April 14, 1931. L. M. KARNASCH 1,800,452

TRANSLUCENT EDGE FOR INSTRUMENTS

Filed March 11, 1929

Fig. 1.

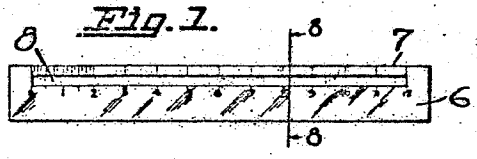


Fig. 2.

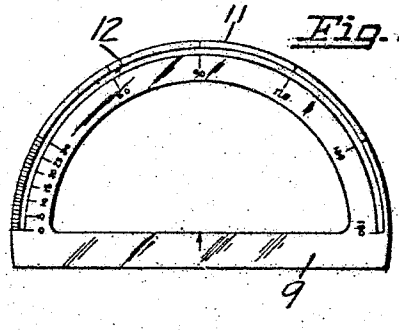


Fig. 3.

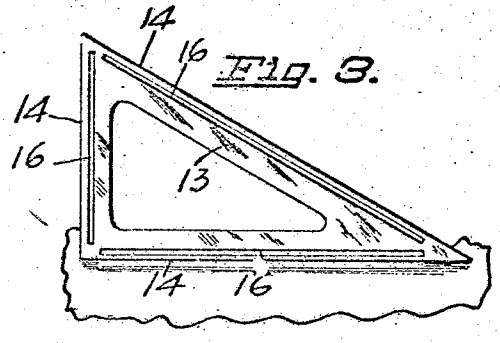


Fig. 4.

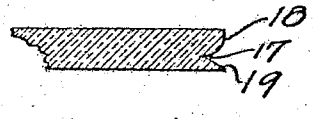


Fig. 5.

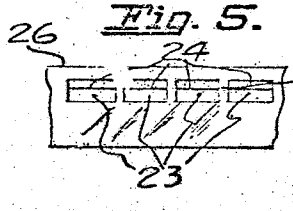


Fig. 6.

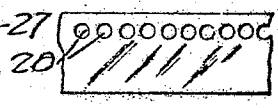


Fig. 7.

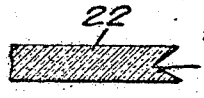


Fig. 8.



Fig. 9.

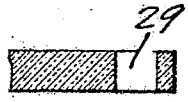


Fig. 10.

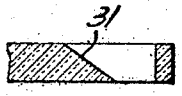


Fig. 11.

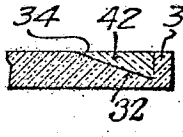


Fig. 12.

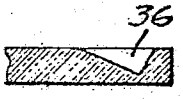


Fig. 13.

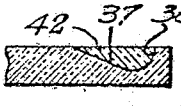
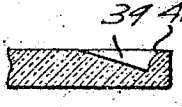


Fig. 14.



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UNITED STATES PATENT OFFICE

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TRANSLUCENT EDGE FOR INSTRUMENTS

Application filed March 11, 1929. Serial No. 346,027.

The invention forming the subject matter of this application relates to translucent edges for instruments or the like. The usual flux of light gives very readily the average illumination over any surface in the path thereof; it does not, however, readily yield directly on a particular part of the working plane. The edge of any instrument casts a shadow upon the working plane or surface when the edge is so positioned as to obstruct the light rays. Naturally when the edge of an instrument is so disposed as to face the light rays, the working surface or plane immediately below the said edge will be illuminated. There are many instances in which it is impractical, even impossible, to so place the instrument on a working surface that the edge thereof at which the work is done is facing the light rays. The shadow cast by an edge of an instrument renders it extremely difficult to perform the work thereat which requires any degree of accuracy, such as the work done in connection with measurements or scales.

The primary object of the invention is the provision of a translucent portion, border or edge for instruments of any kind, which edge is so formed as to direct the light rays upon the working surface adjacent to said portion, border or edge, thereby illuminating the working surface thereat and allowing the performance of accurate work.

Another object of the invention is to provide a translucent edge for instruments which is adapted to produce a refraction, in other words, a change in direction of the rays of the light when they enter obliquely a medium of different density from that through which they had previously moved; the said refraction being such as to direct the light rays transmitted through the edge upon the working surface adjacent to said edge, whereby the casting of a shadow by said edge is effectively obviated.

Another object of the invention is the provision of a translucent edge for instruments in which edge a stratum is formed of a medium, which is translucent and is of a different density than that of the material from which the instrument or said edge is made and which stratum is so disposed as to receive the rays of light obliquely when the edge is so placed as to obstruct the flux of light; the different density of the stratum and of the translucent edge causing the refraction of the light rays transmitted so as to direct the light rays upon the working surface adjacent to the said edge.

Another object of the invention is the provision of a cavity adjacent the translucent working edge of an instrument adapted to obliquely receive the light rays when the edge is turned away from the light; the said cavity being filled with a medium of different density than that of the translucent edge thereby to cause a refraction and to direct the light rays upon the working surface at said edge; the medium in said cavity may be air or any other translucent substance such as glass or the like; the said cavity being substantially parallel with the edge of the instrument, or it may otherwise conform to the shape and curvature of said working edge.

Other objects and advantages are to provide a translucent edge for instruments or the like, that will be superior in point of simplicity, inexpensiveness of construction, positiveness of operation, and facility and convenience in use and general efficiency.

In this specification and the annexed drawings, the invention is illustrated in the form considered to be the best, but it is to be understood that the invention is not limited to such form, because it may be embodied in other forms; and it is also to be understood that in and by the claims following the description, it is desired to cover the invention in whatsoever form it may be embodied.

The invention is clearly illustrated in the accompanying drawings in which,

Fig. 1 is an illustration of the use of my directional translucent working edge on a ruler;

Fig. 2 is an illustration of the translucent working edge as formed on a protractor;

Fig. 3 is an illustration of the translucent directional working edge as used on the ruling edges of a triangle;

Fig. 4 is a fragmentary sectional view of

a translucent edge showing the cavity or slot formed in the vertical side of the edge;

Fig. 5 is a plan view of the fragment of an instrument showing the substantially rectangular cavities formed in spaced relation to each other on the face of the instrument;

Fig. 6 is a plan view of a fragment of an instrument showing circular apertures formed adjacent to the edge of the instrument;

Fig. 7 is a modified form of the slot or cavity formed in the side of the edge of an instrument;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 1, showing the slot as having a substantially semi-circular cross section;

Fig. 9 is a fragmentary sectional view of an instrument showing an aperture formed adjacent the edge thereof;

Fig. 10 is a fragmentary sectional view of an instrument showing an aperture with an inclined side formed adjacent the edge thereof;

Fig. 11 is a fragmentary sectional view of an instrument showing the cross sectional outline of a slot or indentation formed adjacent the edge of an instrument;

Fig. 12 illustrates a modified form of the slot or indentation cross section;

Fig. 13 illustrates the shape of a slot for diffusing the light; and

Fig. 14 illustrates the shape of a slot for concentrating the light rays.

In carrying out my invention I make use of an instrument in the illustration in Fig. 1 indicated as a scale of graduated ruler 6, adjacent to an edge 7 of which and in parallelism therewith, is formed an indentation or slot 8. The slot 8 is so formed that it receives the light rays obliquely when the ruler 6 in in such a position that the edge 7 thereof would obstruct the light rays. In the present instance the slot or indentation 8 is filled with air, while the whole instrument 6 is made of a translucent material. However, in some instances, it is possible that only the edge be made of translucent material, but the construction heretofore set forth would effectively prevent the casting of a shadow upon the working surface by the edge 7.

As shown in Fig. 8, the cross section of the indentation 8 is semi-circular so that it slightly diffuses the light rays passing therethrough. The air is of a different density than any transparent material from which the edge of an instrument may be made, therefore a refraction occurs, in other words, the direction of a ray of light will be changed when it enters obliquely a medium of different density than the air through which it has previously moved. The slot or indentation 8 is so spaced from the edge that the change of direction will cause the rays of light to illuminate the working surface adjacent to the edge 7.

In Fig. 2 a protractor 9 is shown, adjacent to the curved edge 11 of which is formed a slot 12. The cross section of the slot 12 may be of any of the forms hereinafter set forth so as to cause the said change of direction of the rays of light and illuminate the working surface immediately adjacent to the edge 11. In the case of instruments which are provided with graduations, the slots or indentations may be formed on the side on which the graduation marks are disposed, but it is preferable to have the indentations on the smooth, unmarked side of the instrument so that the graduations may be disposed directly upon the working surface which will allow more accurate use of said instrument.

A triangle 13, shown in Fig. 3, is provided at each of its ruling edges 14 with indentations or slots 16, which receive the rays of light obliquely when the respective edge is turned away from the source of light. The indentations 16 cause the change of direction of the light rays in the manner heretofore set forth.

In some instances it may be desirable and allowable to form the air pocket or slot in the vertical side of the respective edge of the instrument. In that case the shape of slot may assume various forms in accordance with the necessity of illumination. Such a form is illustrated in Fig. 4 where the upper side of the slot 17 is curved as at 18, while the lower side 19 of the slot 17 leads to the working surface so that the light is directed thereupon. In Fig. 7, a substantially V-shaped slot 21 is formed on a vertical side of the instrument 22.

The aperture or slot for the diffusion of the light rays may be formed with bridges therebetween or in sections as shown in Fig. 5 and in Fig. 6. In Fig. 5 substantially rectangular apertures 23 are formed with an inclined side 24 adjacent the edge 26 of the instrument so that the inclined side 24 receives the rays of light obliquely. The apertures 23 are separated from each other by bridges 27. This construction may be advantageous in certain instances where a continuous, strong illumination adjacent to the entire edge of an instrument is not essential. For this same purpose cylindrical holes 28 may be also used, disposed in spaced relation to each other and suitably spaced from the edge of the instrument as illustrated in Fig. 6.

Fig. 9 and Fig. 10 show apertures instead of indentations or slots so as to provide a stratum of different density adjacent to the edge of the instrument. The aperture 29 has vertical sides, while one side of the aperture 31 is formed on an incline so as to receive and reflect the light rays in slightly different

manner in accordance with the instrument with which they are used.

The cross sectional shape of the indentations or slots 8, 12 or 16, may be adapted to different conditions so as to merely cause a refraction or to diffuse or concentrate the light at certain points. In Fig. 11 the indentation 32 formed on the face of the instrument is suitably spaced from the edge thereof and a side 33 of the indentation 32 is parallel with the edge, while the bottom 34 of the indentation 32 is formed on an incline. The indentation 36 in Fig. 12 has both sides thereof formed at an angle so that the light rays are received at a different angle than in the other indentations heretofore set forth.

The slot or indentation 37 illustrated in Fig. 13 terminates in a concave curved side 38 which not only receives the rays of light obliquely but it also causes a diffusion of the rays of light. The indentation or slot 39 on the contrary, terminates in a convex curved side 41 adjacent to the edge of the instrument thereby concentrating the light rays on the desired points. This last mentioned form of the slot or indentation is illustrated in Fig. 14.

It is apparent that the slot or indentation or aperture formed adjacent to the edge of an instrument may be of a variety of shapes in accordance with the intensity of the illumination required. While in the illustration heretofore described, a slot or an indentation, or an aperture is employed, it is evident that the function of said cavities thus formed is to hold a medium of different density than that of the material from which the edge of the instrument is made. In the present illustration this medium is air. However, any other translucent material may be inserted and held in any suitable manner in said cavities so as to effect the directional transmission of light rays through the edge of the instrument. For instance, suitable glass or celluloid bodies 42 may be secured or welded or otherwise held in said cavities to accomplish the purposes of the invention.

It is also to be noted that while for the purpose of illustration I have shown the formation of translucent edges upon a scale, a protractor, and a triangle, such translucent edges may be formed on any other type of instruments in the use of which a certain degree of accuracy is essential. Such an instrument may be a compass, the edges of the pointers or needles of which may be formed in the manner heretofore set forth so as to facilitate the reading of the compass regardless of the location of the source of light illuminating the plane thereof. There are numerous engineering and other type of instruments in the use of which the edges when disposed in a certain way relatively to the source of light, cast a shadow upon the working plane or surface whereby accurate work is rendered difficult and in all such cases, the formation of the edges in the manner heretofore set forth, effectively obviates the casting of a shadow by said edge and suitably illuminates the working plane immediately adjacent to the respective edge of any instrument.

Having thus described this invention, what I claim and desire to secure by Letters Patent is:

1. In measuring and geometrical instruments, a transparent border and means operatively related to the border to change the direction of the light rays passing to said border so as to direct the light rays to illuminate a surface on which the instrument is used, adjacent said border.

2. In a measuring or geometrical instrument, a translucent body forming an operative edge of said instrument and a second translucent body disposed adjacent the said edge, the said translucent bodies being of different density to change the direction of the light rays passing therethru so as to direct the rays onto a surface on which the instrument is used.

3. In a measuring or geometrical instrument, a translucent body forming an operative edge of said instrument and a second translucent body disposed adjacent the said edge so as to directionally transmit the rays of light entering the same obliquely, the said translucent bodies being of different density to change the direction of the light rays passing therethru so as to direct the rays onto a surface on which the instrument is used.

4. In a measuring or geometrical instrument, a translucent body forming a border of said instrument, said instrument having a cavity formed in operative relation to the said border to change the direction of the rays of light toward said border to cause the illumination of a working surface adjacent said border.

5. In a measuring or geometrical instrument, a translucent body forming a border of said instrument, said instrument having a cavity formed in operative relation to the said border and a translucent body of a density different from that of the translucent border filling said cavity to change the direction of the rays of light toward said border to cause the illumination of a working surface adjacent said border.

6. In a measuring or geometrical instrument, a translucent body forming a portion of said instrument adjacent to a surface on which the instrument is used; another translucent body disposed in operative relation to said first portion to direct the rays of light passing therethru so as to illuminate said surface adjacent the said first mentioned portion.

7. In a measuring or geometrical instrument, a translucent body forming an edge of

the instrument adjacent a surface on which the instrument is used, said instrument having a cavity formed therein in operative relation to said edge to receive the rays of light obliquely and to directionally transmit the same to the edge; the ratio of the difference in the density of said translucent body and of the air filling the said cavity being such as to cause the refraction of the light rays so as to direct the same upon the said surface adjacent to the said edge.

8. In a measuring or geometrical instrument a translucent working edge on the instrument to be placed on a surface on which the instrument is used and a cavity formed in operative relation to the said edge being adapted to change the direction of the light rays to direct the same thru said edge onto the said surface.

9. In a measuring or geometrical instrument a translucent working edge on the instrument to be placed on a surface on which the instrument is used and a cavity formed in operative relation to the said edge being adapted to change the direction of the light rays to direct the same thru said edge onto the said surface, the cavity cooperating with the edge in such manner as to direct the light rays onto the said surface in the immediate proximity of the edge.

10. In a measuring or geometrical instrument a translucent working edge on the instrument to be placed on a surface on which the instrument is used and a cavity formed in operative relation to the said edge being adapted to change the direction of the light rays to direct the same thru said edge onto the said surface; and a translucent filler in said cavity having a density different from that of the translucent edge.

In testimony whereof, I have hereunto set my hand at San Francisco, California, this 4th day of March, 1929.

LEOPOLD M. KARNASCH.