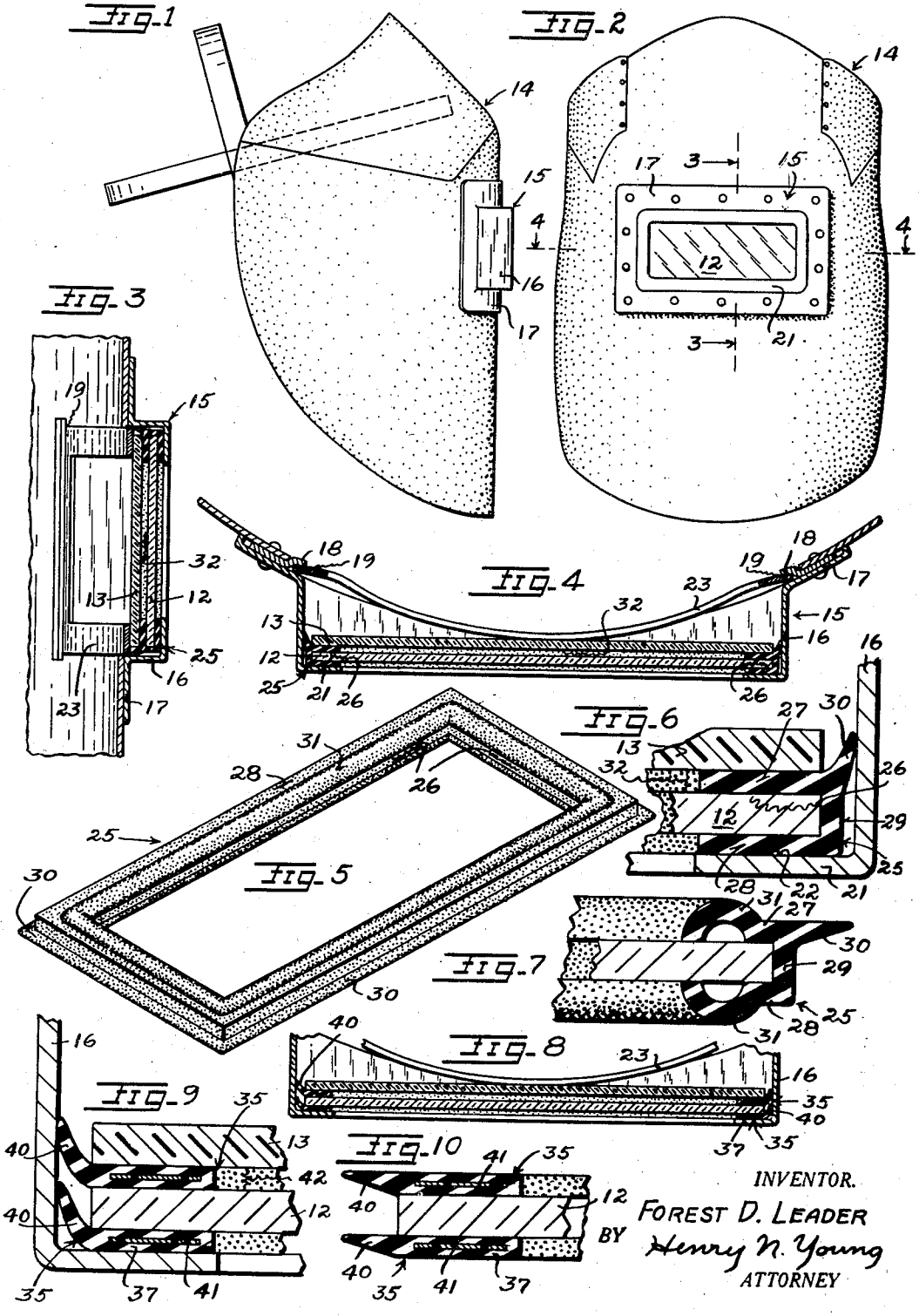
March 28, 1939. F. D. LEADER 2,152,383

FACE SHIELD

Filed June 26, 1937



Patented Mar. 28, 1939 2,152,383

UNITED STATES PATENT OFFICE

2,152,383

FACE SHIELD

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Application June 26, 1937, Serial No. 150,558

4 Claims. (Cl. 2—8)

The invention relates to the mounting of sight panes in face shields whereof the panes are arranged to protect a user's eyes and face from injurious rays and/or excessive heat emanating from the work.

A primary object is to provide a positive and particularly effective light seal for the sight panes in their mounting.

Another object of the invention is to provide a positively sealed heat-insulation space between adjacent panes at a sight opening.

A further purpose is to effect the foregoing objects by the use of a single member of simple structure.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth or be apparent in the following description of typical embodiments of the invention, and in the accompanying drawing, in which,

Figures 1 and 2 are side and front views respectively of a welder's hood having a sight opening provided with the features of present invention.

Figures 3 and 4 are enlarged fragmentary sectional views taken respectively at the lines 3—3 and 4—4 in Figure 2.

Figure 5 is a perspective view of a light-sealing element which is shown in section in Figures 3 and 4.

Figure 6 is an enlarged fragmentary sectional view showing the sealing element mounted on a pane and operative for its intended purposes.

Figure 7 is an enlarged fragmentary sectional view showing the sealing element as it appears when mounted on a dismounted pane.

Figure 8 is a fragmentary view similar to Figure 4 and showing another form of sealing element in use.

Figures 9 and 10 are enlarged fragmentary sectional views respectively showing the mounted sealing element of Figure 8 in operative and inoperative condition.

As particularly shown for purposes of illustration, the features of present invention are utilized in mounting forward and rear panes 12 and 13 at the sight opening of a face shield 14 of a type used by welders and other mechanics whose eyes and faces must be protected from light and other rays. The present shield 14 is arranged for its mounting and carrying on the user's head, but it might be arranged for its manual support in front of the face, or be fixedly supported opposite the work in such manner that the user may be physically free of it; the shield form and mounting are generally immaterial to the present invention.

In the present instance, the shield 14 is provided with a single rectangular opening in its front wall, and a frame 15 for carrying the sight panes is fixed at said opening. The peripheral wall 16 of the frame 15 extends forwardly from the shield front to define a bore of uniform cross-section, and the panes 12 and 13 are similar in outline to said bore, but slightly smaller than the same. A continuous flange 17 extends outwardly from the rearward, or base, edge of the frame wall 16 for flat engagement with the shield front around its opening, and is permanently secured to the shield in light-sealing engagement with its front face, as by rivets, to mount the frame in its place. At the frame 15, the present shield is cylindrically curved about an axis which lies in the normally upright median plane of the user's head, and the inner line of the upper and lower portions of the wall 16 are correspondingly curved whereby the flange 17 may fit flat against the shield front thereat. Rigid plates 18 are engaged between the shield wall and the side portions of the flange 17 with their inner edges in alignment with the frame bore, and have inner portions thereof rearwardly offset to cooperate with the flange 17 to define grooves 19 along the upright sides of the sight opening and behind the frame 15, the utility of said grooves being hereinafter brought out.

A continuous flange 21 extends inwardly from the forward edge of the frame wall 16 to define the effective sight opening for the shield, said opening being of less extent than the shield body opening at which the frame 15 is mounted. The free flange edges are respectively parallel to the wall portions from which they extend, and the flange is arranged to provide a flat seat 22 against which an assembly of panes may be directly engaged and releasably secured in a suitable manner, as by the use of the disclosed securing element 23.

The element 23 essentially comprises a closed rectangular frame of resiliently flexible sheet material having an interior opening at least as large as the sight opening provided by the flange 21 and arranged to be sprung into position between the grooves 19 to have its intermediate top and bottom portions resiliently bear transversely against the pane assembly at the rear thereof. For its use in the described manner, the element 23 has a height slightly less than the bore of the frame 15 and is laterally wider than said bore by an amount which will provide the desired

degree of pressure against the panes when the side edges of the element are engaged in the grooves 19. The hood and frame 15 would usually be shaped of material which is non-conductive to heat and electricity.

It will now be noted that the rear pane or lens 13 would be one which is arranged to so reduce the intensity of light passing through it and to filter out undesirable actinic rays and radiant energy rays as to prevent injury to the face and/or eyes of a person who must view a source of such light or rays. The pane 13 may be suitably colored and/or fogged and/or coated to give it the desired ray filtering qualities, and may, for descriptive convenience, be referred to as a filter pane. While the pane 13 is shown as a single element, it will be understood that it may comprise a plural pane assembly which produces the required filtering of rays. Also, reference to light rays herein is intended to cover all rays which may be directed against the filter pane from an electric arc or oxy-acetylene flame or other source.

The front pane 12 is formed of clear glass or the like, and would preferably be shatter-proof. This pane is arranged to function as a guard or cover pane for the filter pane 13, the latter usually being costly to replace whereby the provision of a protective cover pane is normal. Another use for the cover pane is to provide a dead-air heat-insulation space between it and the pane behind it by spacing it slightly from the latter pane.

Since the materials of the panes and pane-carrying frame 15 are different and would have different coefficients of expansion, the panes are made distinctly smaller than the cross-section of the frame space or bore which receives them whereby the edges of the panes are spaced from the opposed inner faces of the frame side wall 16. In accordance with the present invention, a sealing means is provided for direct operation between the filter pane 13 and the frame wall 16 whereby light and other rays travelling laterally through or rearwardly around the edges of the clear cover pane may not penetrate inwardly between the edges of the filter pane and the frame bore, and so reach the operator's eyes or face to in part nullify the filtering which is afforded by the pane, the latter being particularly serious in work with the electric arc.

As brought out in Figures 3 to 7 inclusive, a sealing element 25 is provided for mounting on the cover pane 12 for its cooperation with the frame bore to positively prevent light leakage around the edges of the filter pane 13 when the panes are mounted in the frame in the arrangement shown. The element 25 comprises a continuous strip of a resiliently stretchable homogeneous and yielding material such as a rubber composition, having an interior continuous groove 26 for fittedly receiving a pane peripherally thereof with the element in slightly stretched condition whereby the element may be mounted on the pane and encloses the pane edge portions in the groove 26.

The rearward side wall 27 of the channel portion of the element 25 is arranged for sealing and cushioning interposition between the pane 12 and the pane 13, the forward side wall 28 of said channel is arranged for sealing and cushioning interposition between the pane 12 and the seat 22, provided by the front flange 21. The cross-wall 29 which defines the bottom of the groove 26 provides an imperforate connection between the walls 27 and 28, whereby the peripheral edge portions of the cover pane 12 are completely enclosed for preventing an escape of any rays laterally from the pane. Preferably, and as brought out in Figures 5 and 7, the inner edge portions of the walls 27 and 28 are formed with continuous hollow embossments 31 for flattening out when the pane 12 is pressed between the pane 13 and the seat 22 through the action of the fastening element 23; in this manner, a line engagement and sealing contact is insured between the element and the members which it exteriorly engages. It will be understood that the wall 27 of the element 25 is operative as a spacing means between the panes 12 and 13 whereby a sealed dead-air space 32 is defined between the interior pane portions through which light rays are to transversely pass.

It will now be noted that the frame flange 21, being exposed at the front of the hood 14, is subject to possible deformation by forcible contact with other objects during the use of the hood whereby the desired full seal between it and the wall 28 of the element 25 may become broken to permit the travel of light and other rays rearwardly around the front of the pane and between the element wall 29 and the frame wall 16. Accordingly, a main and final sealing means is provided as part of the element 25 and for operation between the element and the frame bore at the frame wall 16, said means comprising an integral and uniform apron-like extension 30 of the element for direct and sealing engagement with said wall.

The apron 30 may taper to its free edge in the illustrated manner, and normally extends in the general plane of the element 25 to such a distance that the over-all height and width of the element on the unmounted pane appreciably exceed the height and width of the frame bore which it is to engage. When the pane 12 having the element 25 mounted thereon is inserted transversely in the frame bore from the rear thereof and moved forwardly to engage the element with the frame seat 22, the apron 30 is arranged to be flexed rearwardly to have its forward face sealedly fitted against the wall 16 by reason of its resiliency, the relation being illustrated in Figures 3 and 4 and 6. As particularly shown, the sealing apron 30 protrudes in alignment with the portion 27 of the element 25 whereby the combination of the portions 27 and 30 may alone provide the necessary seal against the passage of light rearwardly around the edges of the pane 13, while the engagement of the pane and element maintains these members in mutually centered relation and the portion 28 is operative as a cushioning gasket between the pane 12 and the seat 22.

The provision and installation of an alternative device for accomplishing the previously discussed purposes is disclosed in Figures 8 to 10 inclusive. In this embodiment, a pair of like elements 35 is employed in lieu of the single element 25, and each element 35 comprises a flat open frame-like structure corresponding to the combination of the parts 27 and 30 of the element 25. Each element 35 has an inner portion 37 for flat disposition against a side of a pane 12 and an apron portion 40 which is resiliently flexible for its bending out of the plane of the portion 37 while in sealing engagement with the frame wall 16. The portions 37 may have perforated plates 41 of relatively hard material embedded and keyed therein for maintaining the

full area for the elements, it being noted that the latter function is accomplished by the pane which mounts an element **25**.

It will be understood that the apron portion **40** of an element **35** will, when disposed between panes **12** and **13**, function to prevent the passage of light and other rays rearwardly around the edges of the pane **13**, and that the inner portion **37** of the element will act as a spacer to provide a heat-insulating dead-air space **42** between the panes. An element **35** disposed between the pane **12** and the seat **22** is operative as a cushioning contact in lieu of the wall **28** of an element **25**. Also, the aprons **40** and the portion of the wall **16** between them are cooperative to provide a trap for any rays which may escape laterally through the pane **12**.

The disclosed arrangements have assumed that the light-filtering means is at the front of and/or within the filter pane **13** whereby no deleterious rays may escape laterally from the pane edges behind the apron **30**. If a different condition obtains, or if no cover pane is to be used, an element **25** may be mounted directly on the filter pane for providing the desired ray seal; the corresponding use of an element **35** would, of course, require the provision of an extra pane against the element **35** at the rear face of the filter pane.

From the foregoing description taken in connection with the accompanying drawing, the advantages of the construction and manner of use will be readily understood by those skilled in the art to which the invention appertains, and while I have described the invention in terms of what I now consider to be preferred embodiments thereof, I desire to have it understood that the devices shown are primarily illustrative, and that such changes may be made, when desired, as fall within the scope of the following claims.

I claim:

1. In a face shield of the character described, a pane-holding frame defining a bore for receiving a pane, a pane for mounting in said bore across the axis thereof, and a continuous light-sealing member of resilient material engaging the pane and providing a sealing apron having a periphery which is similar to the bore cross-section and appreciably exceeds the bore periphery whereby the outer apron portion is arranged to be bent out of the plane of its pane-engaging portion for flat engagement with the bore when it is operative in the bore.

2. A structure in accordance with claim 1 wherein the sealing member is provided with a continuous interior channel for receiving the peripheral portion of the pane for mounting the member on the pane.

3. In a face shield of the character described, a laterally closed pane-holding frame defining a uniform bore extending in the direction of sight and terminating at a continuous seat at an end thereof, a cover pane for mounting in said bore, a filter pane for mounting in said bore behind said cover pane, and a resiliently yielding sealing element for compressed engagement between the edge portions of the panes to define a dead-air space between the panes and provided with a normally lateral extension beyond the filter pane for its transverse flexure to have its outer portion engage flat against the frame bore to provide a light seal between the filter pane and bore peripherally thereof, and releasable means operative to compressedly engage the sealing element and cover pane between the filter pane and seat.

4. A structure in accordance with claim 3 wherein the inner portion of the sealing member encloses the peripheral edge portion of the cover pane.

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