

April 2, 1946.

F. M. BOWERS

2,397,722

FACE PROTECTIVE DEVICE

Filed Jan. 19, 1945

2 Sheets-Sheet 1

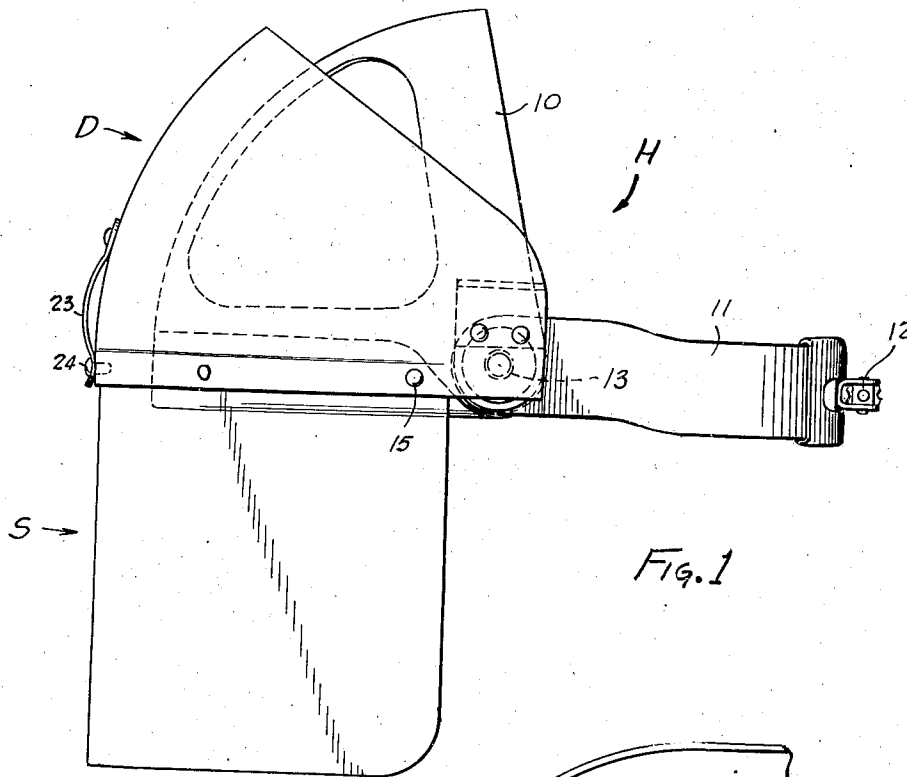


Fig. 1

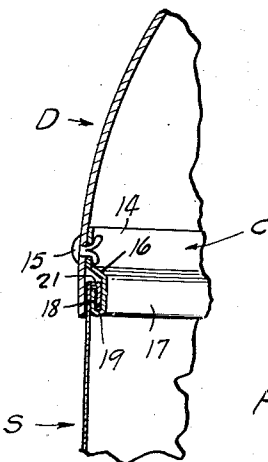


Fig. 3

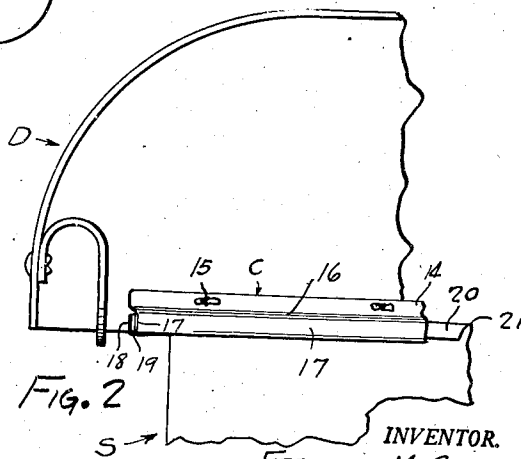


Fig. 2

INVENTOR.
FREDERICK M. BOWERS
BY *Joshua R. Bowers*
HIS ATTORNEY

April 2, 1946.

F. M. BOWERS

2,397,722

FACE PROTECTIVE DEVICE

Filed Jan. 19, 1945

2 Sheets-Sheet 2

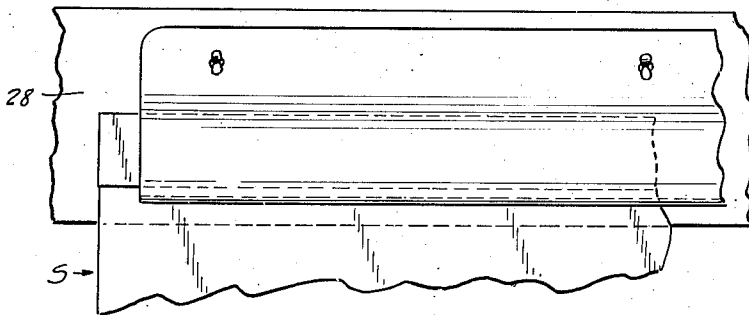


Fig. 4

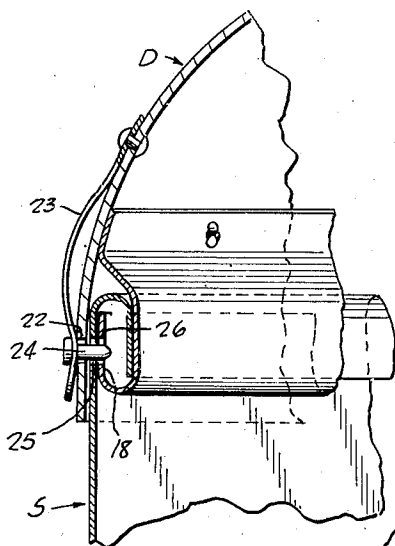


Fig. 5

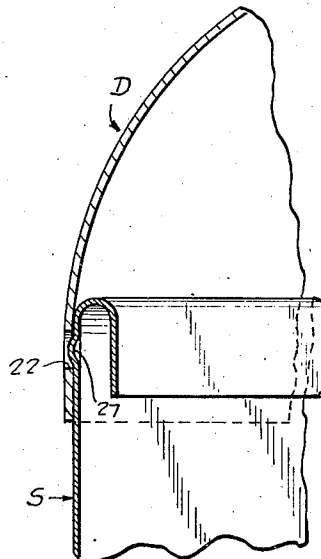


Fig. 6

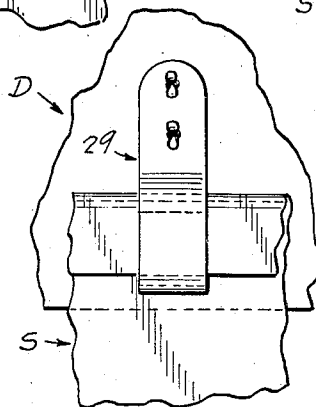


Fig. 7

INVENTOR.
FREDERIC M. BOWERS
BY *Joshua R. Hottel*
HIS ATTORNEY.

UNITED STATES PATENT OFFICE

2,397,722

FACE PROTECTIVE DEVICE

Frederick M. Bowers, Delaware County, Pa., assignor to Fibre Metal Products Company, Chester, Pa., a partnership

Application January 19, 1945, Serial No. 573,583

7 Claims. (Cl. 2—8)

This invention relates to protective devices commonly known as face shields, and is concerned primarily with a face shield that is movable into and out of protecting position by a swinging movement.

A face shield of the type with which this invention is concerned ordinarily includes as essential elements, a headgear that is adapted to be continuously worn by the user, and a shield element that is curved to generally conform to the shape of a wearer's face so as to assume a protective position thereover, and which shield element is pivotally mounted on the headgear.

In actual practice, the shield element is not directly mounted on the headgear. An intermediate element, such as a curved strip of vulcanized fibre or a dome-like protective part which covers the front portion of a wearer's head, is pivotally mounted on the headgear, while the shield element is detachably secured to this so-called intermediate element.

While the shield element itself is ordinarily made from a completely transparent flexible material, it sometimes takes the form of a wire mesh or screen, but in either event, during continued use, it is subject to becoming damaged, such as by having flying particles impinged thereagainst, and it, therefore, becomes necessary, from time to time, to replace the shield element.

In view of this need for replacement, there have been provided devices in which complementary elements of detachable snap fasteners are carried on the shield and intermediate elements respectively, or bolts have been employed to establish the detachable connection. In either case, the bolts or snap fasteners are located at spaced intervals around the curved upper edge of the shield and the intermediate element to which it is secured.

While this arrangement appears to be satisfactory in theory, under conditions of practical usage one or the other of the parts becomes warped, or one becomes shorter than the other due to the difference in shrinkage between the two materials. Either of these conditions produces a change in the spacing of the snap fastening elements or bolts; thus when an attempt is made to re-establish the connection, the elements of the snap fasteners do not properly meet, or the bolt openings do not properly align.

With this highly unsatisfactory condition in mind, this invention has in view as its foremost objective the provision of a novel and improved arrangement for establishing the detachable connection between the shield element itself and the

intermediate element to which it is directly secured and which, in turn, is pivotally mounted on the headgear.

In carrying out this idea in a practical embodiment, the invention provides, on the intermediate part adjacent to the lower edge thereof, a channel-like member which presents a free flange that is spaced from the adjacent face of said intermediate member. The upper edge of the shield element is turned back on itself to provide a flange that is spaced from the main body of the shield. These two flanges cooperate to establish the connection by an interfitting relation between the two, which is created when one end of the flanged upper edge of the shield is introduced into the spaces between the channel-like connecting member, the flange carried thereby, and the intermediate element, by a sliding movement.

In assembling the shield element on the intermediate element which is carried by the headgear, it is important that the shield element be properly centered so that it will assume the correct protective position in front of the wearer's face. Thus, another highly important object of the invention is the provision, in a face protective device of the character above noted, of means for centering and properly locating the shield element with respect to the intermediate element.

In actual practice this centering means may take any of several embodiments. In a preferred form of the invention, a leaf spring is mounted on the intermediate member and carries a lug which passes through aligned openings in said intermediate member, shield element and connecting member respectively, when these parts are in their proper relative position.

In another form, the shield element adjacent to the flange at the upper edge thereof, may be deformed to provide a boss which is adapted to interfit with an opening in the intermediate member when the shield element is properly located with respect thereto.

An important feature of the invention resides in the structural characteristics which maintain the assembled relation of the shield with respect to the intermediate element. Not only does the centering means above described serve to maintain the assembled relation but the curved formation of both the intermediate and shield elements enter into the performance of this function.

Ordinarily the shield element has a natural curvature that is different from that of the intermediate element to which it is secured, and it has a natural resiliency. Thus, when the inter-

fitting between the two is established the shield element is deformed from its natural curvature and the tendency to return thereto generates friction which aids in maintaining the assembly.

It is further noted that the overall curved length of the interfitting edges of the shield and intermediate elements is capable of change without binding or imparting strain to the other parts. Such variations in length occur due to the difference in the co-efficients of expansion and contraction of the different materials from which these parts are made.

It is now common practice in this field to employ shield elements of varying degrees of thickness. With the detachable connection of this invention, a single channel connecting member on the intermediate part will accommodate various thicknesses of the shield element over a fairly wide range, and regardless of the particular thickness of the shield employed. There will likewise be a creation of friction and a correct desired relative positioning of the shield element and the intermediate element to which it is attached.

Yet another important object of the invention is the provision, in a face protective device of the character above set forth, of channel-like connection means between the intermediate and shield elements which takes the form of a plurality of channel-like connecting members which are appropriately spaced along the lower curved edge of the intermediate member. The use of this plurality of connecting members amounts to interrupting the single continuous channel-like member above described.

One advantage of this arrangement lies in the fact that the mass of the complete device is reduced by the difference in weight between the continuous channel-like connecting member and the number which are necessary to anchor the shield element in position.

Various other more detailed objects and advantages of the invention such as arise in connection with carrying out the above noted thoughts in a practical embodiment, will in part become apparent, and in part be hereinafter stated as the description of the invention proceeds.

The invention, therefore, comprises a face protective device, including a headgear on which is pivotally mounted a curved intermediate member, and detachably secured to this intermediate member is a curved shield element. The detachable connection is established by a channel-like connecting member which is carried by the intermediate member adjacent to the lower edge thereof, and presents a flange that is spaced between said channel-like connecting member and said intermediate element. Slidably interfitting with this flange on the channel-like connecting member is a flange that is formed on the upper curved edge of the shield element. Centering means may also be included for properly locating the shield element with respect to the intermediate element.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawings, wherein:

Figure 1 is a view in side elevation of a face protective device embodying the precepts of this invention;

Figure 2 is an enlarged detailed view in elevation looking from the inside and with parts broken away;

Figure 3 is another enlarged detailed view taken

as a vertical section through the connected portions of the intermediate and shield elements;

Figure 4 is a detailed view looking from the inside and showing one variation in the construction of the intermediate element;

Figure 5 is a fragmentary view somewhat similar to Figure 3 and bringing out the operation of one type of centering means;

Figure 6 is a similar view developing the mode of functioning of another type of centering means; and

Figure 7 is an inside view in elevation illustrating the use of the interrupted channel-like connecting member as compared to the continuous one.

Referring now to the drawings and first more particularly to the form of the invention illustrated in Figures 1, 2, 3, and 5, the face protective device of this invention is shown as comprising a headgear H together with an intermediate element which in this species of the invention takes the form of a dome-like part D, to which is secured a transparent shield S.

It is notable that the head gear H may take any form which has been found to meet with approval in this field.

As illustrated in Figure 1, the headgear H comprises a skeleton-like front portion 10 to which is pivotally attached a rear part 11. The latter is rendered adjustable by the adjusting device shown at 12 and to permit an accurate adjustment of the headgear to the size of the head of any particular user. The headgear itself is not any particular part of the present invention. All that is required thereof is that it afford a proper anchorage for the pivotal mounting of the protective elements.

The dome-like part D may be made from any appropriate material, although the invention has particularly in mind the use of vulcanized fibre which readily lends itself to the molding operation necessary to properly shape this part. In protective position the part D is intended to cover the forehead and front top part of the wearer's head. The part D is pivotally mounted on the headgear H by pivotal connections on each side thereof. One such pivotal connection is shown at 13 in Figure 1.

Referring now more particularly to Figures 2 and 3, the channel-like connecting element is referred to in its entirety by the reference character C. The channel part C has a curvature corresponding to that of the dome-like part D, and is secured thereto along the inner face adjacent to the lower edge thereof.

The channel-like connecting member C comprises an anchoring flange 14 which may be firmly and permanently attached to the dome D in any preferred manner. Rivets shown at 15 are an illustration of one way in which this connection may be established. Extending inwardly from the anchoring flange 14 and preferably slightly downwardly is an inclined central portion 16. Integrally joined to the lower inner edge of the central portion 16 is an inner body 17 which extends downwardly. It will be noted that the part 17 is spaced an appreciable distance from the dome D. A connecting flange 18 is integrally joined to the body part 17 by the bend portion shown at 19. This flange 18 is disposed substantially mid-way between the dome D and the inner body part 17 of the channel connecting part C.

It is notable that the shield element S may be made from any of the materials commonly used for that purpose in this art. In some instances

a wire mesh steel screen has been employed as the main body of the shield. However, the invention has in mind for its preferred embodiment, the use of a more highly transparent material which is flexible and has the required properties of resiliency and elasticity which will cause it to resume a normal position from which it is distorted. Transparent flexible material of this nature is now well known and available to the purchasing public as such.

The upper edge of the shield S is turned over and back on itself to provide a connecting flange 20 that is integrally joined to the main body of the shield S by a bend portion 21. It is evident that this flange 20 is spaced from the main body of the shield S.

It is also important to note that prior to assembly the shield S will have a normal curvature which is different from the curvature of the lower edge of the dome D. Thus, when the assembled relation is completed, the tendency of the shield S to return to its normal curvature creates friction which maintains the assembled relation.

Referring now more particularly to Figure 5, it will be noted that the dome D is formed with an opening 22 which preferably is substantially mid-way between the pivots 13. A leaf spring 23 carries a lug 24 which passes through the opening 22 and into the space within the curved dome D. The upper part of the shield S is formed with an opening 25 which aligns with the opening 22 when the shield S is properly centered with respect thereto. The flange 18 may also be formed with an aperture 26 opposite to the opening 22. The aperture 26, of course, also aligns with the opening 25 when the properly assembled relation is attained.

In assembling shield S on the dome part D a sliding operation is employed, that is, the shield S is slid in from the side. When assembled, the flange 20 assumes a position between the connecting flange 18 and inner body part 17 of the channel connecting member C, and the main body part of the shield S is disposed between the dome D and the connecting flange 18. In this assembled relation, the flange 18, of course, assumes a position in the groove defined by the flange 20 of the shield S.

As the shield S is being slid into position, the free end of the spring 23 may be engaged to retract the lug 24 and thus permit of the sliding operation past this point. When the opening 25 aligns with the opening 22 and aperture 26, the spring is released and the lug 24 assumes a locking position in the aligned openings.

It is evident that the thicknesses of the shield S which might be assembled with any particular channel connecting member C might vary over the range from minimum thickness to the maximum which would be determined by the spacing of the flange 18 from the dome D and inner body part 17. Regardless of what thickness is employed, the curvature, distortion of the shield S and resiliency of the latter, will create enough friction to maintain the assembled relation. When one of the shields S becomes damaged and its replacement is required, all that is necessary is to slide out the damaged shield S and slide in a new one.

Referring now more particularly to Figure 6, a more simplified form of centering device is therein depicted. The dome D or other form of intermediate element, as the case may be, carries the same opening 22 which determines the correct position of the shield S with respect to

the dome D. The material of the shield S is subject to a deforming operation to provide a protruding boss 27, which when it comes opposite to the opening 22 springs thereinto.

This substitute for the spring arrangement eliminates the spring or other equivalent on the exterior face of the dome D. Due to the curvature of the shield S, its property of resiliency, and the effect of the channel-like connecting member C, yielding pressure is set up on this piece to cause it to slip into the opening 22 when it comes thereopposite.

Figure 4 discloses a modification in the construction of the intermediate element. In place of the dome-like part D, a strip of vulcanized fibre may be employed. This strip is shown at 28 and is curved to substantially the same shape as the lower edge portion of the dome D. The channel-like connecting member C is attached to the inner face of the strip 28 in the manner above described, and when the spring device of Figure 5 is employed the spring 23 will be mounted on the outer face of this strip 28.

In the forms of the invention heretofore described, the channel-like connecting member C is a continuous element. However, this is not an absolute requirement. Substantially the same connection may be established by employing a plurality of small sections, each of which would have the same cross-sectional shape as the channel-like connecting member C. Such a section is shown in Figure 7 and identified by the reference character 29. Any required number of these sections 29 could be used. Purely as a matter of example, it is noted that four have been found to be a practical number. They are spaced at intervals along the inner face of the intermediate member. While preferred specific embodiments of the invention are hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions illustrated and described, because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a device of the character described, including headgear adapted to support a face shield element, the improvement which comprises a depending hook-like arcuate member supported by said headgear and having an upwardly turned flange, a transparent, flexible face shield element having a downwardly extending flange adjacent to its upper edge and being adapted to be slid lengthwise into and hook upon the said upwardly extending flange of said hook-like member supported by said headgear, and means carried by said shield element and headgear for insuring proper circumferential disposition of said shield element with respect to said headgear.

2. In a device of the character described, including headgear adapted to support a face shield element, the improvement which comprises a depending hook-like member supported by said headgear and having an upwardly turned flange, providing an arcuate retaining guide, a transparent, flexible face shield element having a downwardly extending arcuate flange adjacent to its upper edge adapted to be slid lengthwise into and hook upon the said upwardly extending flange of said hook-like member supported by said headgear, and means carried by said shield element and headgear for insuring proper circumferential disposition of said shield element with respect to

said headgear, said means comprising a boss and complementary part providing a recess.

3. In a device of the character described, including a headgear and a shield element supported by said headgear, the improvement which comprises a supporting means carried by said headgear and presenting an upwardly extending flange of generally arcuate form in spaced relation to said headgear to provide a generally arcuate channel having one open end adapted for the sliding reception of a supporting portion of a face shield element, a face shield element carrying a downwardly extending flange at its upper end and adapted for slidable insertion into one end of said channel and detent means for securing the said flange carried by said shield element in proper position.

4. In a device of the character described, including a headgear member, a brow-protecting member, and a face shield, the improvement which comprises a depending hook-like means carried by the interior of said brow-protecting member and defining an arcuate channel between the interior of said brow-protecting member and the outer face of said depending hook-like means, a face shield member having a downwardly extending hook-like portion at its upper end and adapted to be slid circumferentially into said channel within said brow-protecting member, and means for locating and securing the supporting portion of said face shield in proper operative position.

5. In a device of the character described, including a headgear member, a brow-protecting member, and a face shield, the improvement which comprises a depending hook-like means carried by the interior of said brow-protecting member and defining an arcuate channel between the interior of said brow-protecting member and the outer face of said depending hook-like

means, a face shield member having a downwardly extending hook-like portion at its upper end and adapted to be slid circumferentially into said channel within said brow-protecting member, and means for locating and securing the supporting portion of said face shield in proper operative position, said last mentioned means comprising detent and recessed parts.

6. In a device of the character described, including a headgear member, a brow-protecting member, and a face shield, the improvement which comprises a depending hook-like means carried by the interior of said brow-protecting member and defining an arcuate channel between the interior of said brow-protecting member and the outer face of said depending hook-like means, a face shield element formed of transparent, resilient material and carrying a depending flange at its upper edge, said flange of said face shield being adapted to be slid circumferentially into said channel and to be deformed sufficiently to permit the material of said face shield to cause a frictional securing engagement between said hook-like member and said face shield.

7. In a device of the character described, having a brow-protecting member, the improvement which comprises a downwardly extending hook-like member supported by said brow-protecting member and constituting therewith a channel open at one end and closed at its top, a face shield member having a downwardly extending flange adapted to be hooked over the edge of said hook-like member at one end and to be slid into said channel with the top of said channel holding the flange of said face shield member in assembled relation to said hook-like member, and means for holding said face shield in proper circumferential relation to said brow-protecting member.

FREDERICK M. BOWERS.