July 9, 1957 R. B. EVANS ET AL 2,798,222

PROTECTIVE DEVICE

Filed July 13, 1954 2 Sheets-Sheet 1

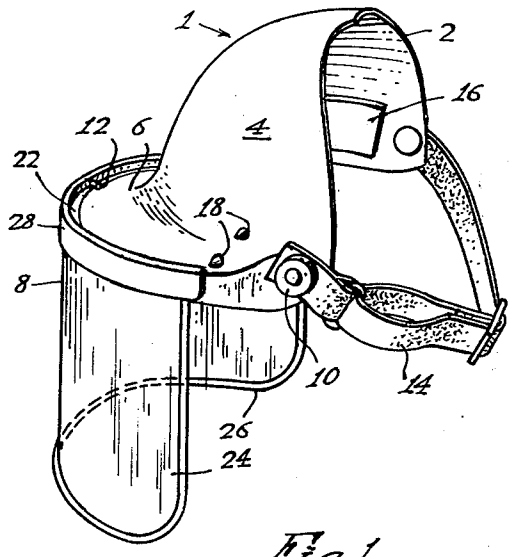


Fig. 1.

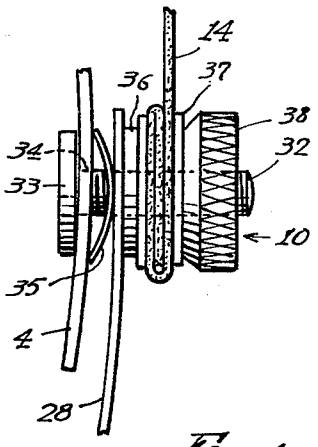


Fig. 4.

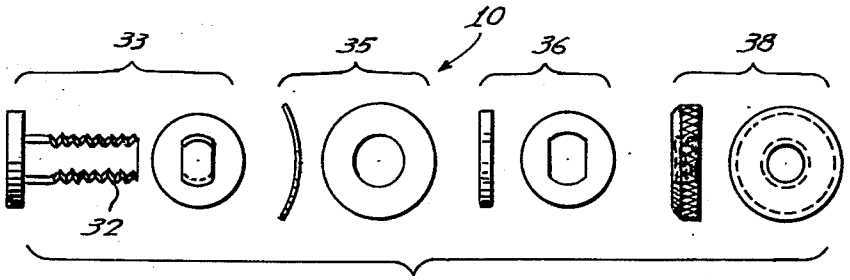


Fig. 5.

INVENTORS.
Robert B. Evans
John F. Byrnes And
Elmer J. Schubert.
Eugene G. Stlepak
ATTORNEY

July 9, 1957 R. B. EVANS ET AL 2,798,222

PROTECTIVE DEVICE

Filed July 13, 1954 2 Sheets-Sheet 2

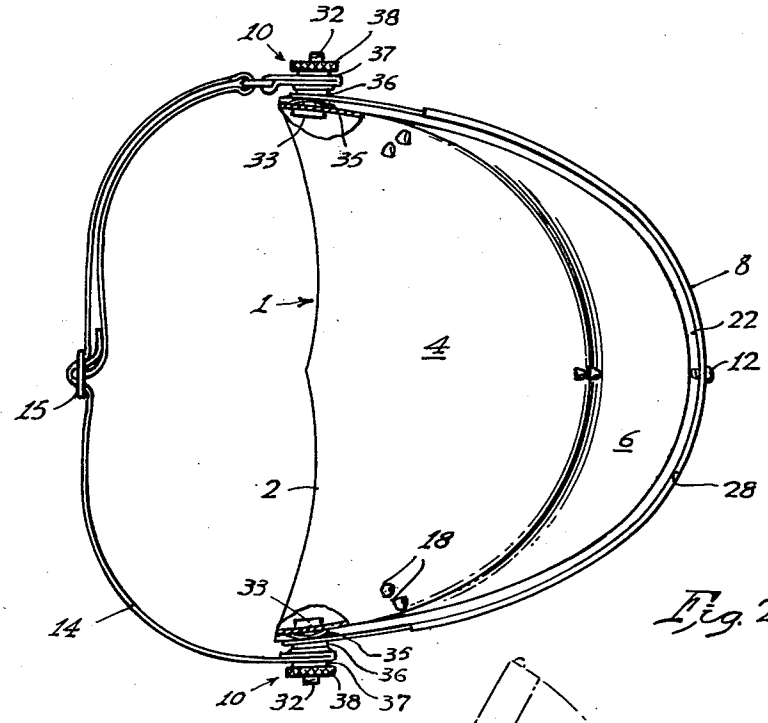


Fig. 2.

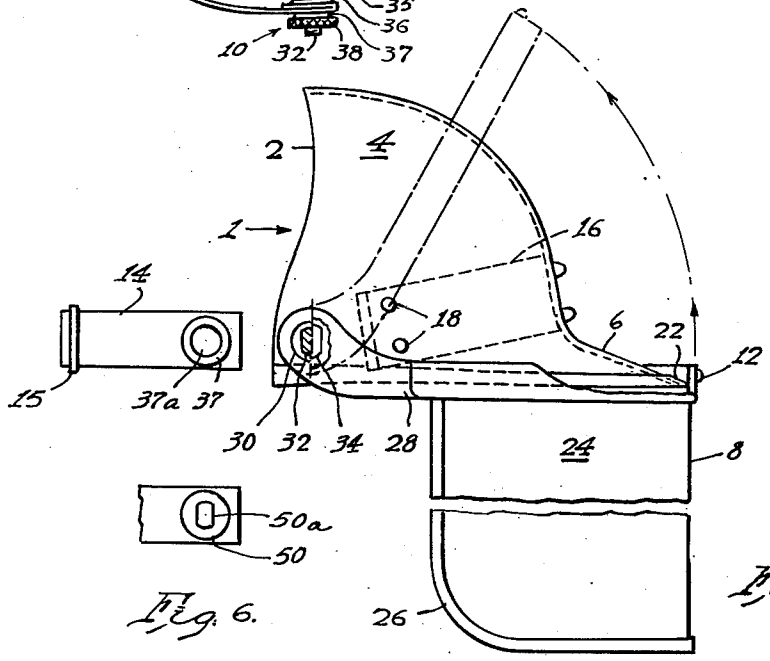


Fig. 6.

Fig. 3.

INVENTORS.
Robert B. Evans
John F. Byrnes And
Elmer J. Schubert.
Edgar G. Sklopak
ATTORNEY

United States Patent Office 2,798,222 Patented July 9, 1957

2,798,222

PROTECTIVE DEVICE

Robert B. Evans, Oakmont, John F. Byrnes, Braddock, and Elmer J. Schubert, Pittsburgh, Pa., assignors to Mine Safety Appliance Company, Pittsburgh, Pa., a corporation of Pennsylvania

Application July 13, 1954, Serial No. 443,112

3 Claims. (Cl. 2—9)

This invention relates to head and face protective devices, and more particularly, to a combined safety headgear and faceshield for use in industry to provide head and face protection against bumping, flying objects, abrasive particles, dust and liquid splash. In many industrial operations, it is of utmost importance that the worker's head and face be adequately protected from injuries and time delaying nuisances resulting from the existence of these deleterious elements, and accordingly, it is a general object of this invention to provide a safety device for protection during these hazardous operations.

More specifically, this invention provides a means for protecting, primarily, the frontal area of the head, including part of the crown and substantially all of the face of the wearer, by the provision of a headgear comprising a visor and a faceshield extending downwardly from and around the visor. The headgear and faceshield are combined in a manner to supply optimum defense against scattered particles and liquid splash. Since the heretoforementioned industrial operations usually require wearing of the protective devices for long periods of time and during all-weather conditions, it is necessary that the protecting means be water resistant and fabricated in such a manner as to provide a light, comfortable fit to the wearer at all times. Also, the protective device must be easily adjustable to provide for various head sizes and constructed to include an efficient adjustment for readily moving the faceshield to various positions. It is, therefore, a further object of this invention to provide a protective device which comprises a lightweight and attractive headgear having a faceshield pivoted thereto and is arranged for engagement in substantially dust and liquid sealing relationship with the headgear in its operational position. Further, the faceshield is pivoted to the headgear by novel friction devices which permit pivotal movement of the faceshield relative to the headgear in an easy and positive manner. Also, a flexible and adjustable headstrap is connected to the friction devices whereby the headgear may be adjusted to various head sizes and, at the same time, provides a comfortable fit to the wearer during the entire period of use.

Various other objects and advantages will be apparent from the foregoing description and accompanying drawings in which:

Fig. 1 is a perspective view of the complete protective device of this invention;

Fig. 2 is a top plan view;

Fig. 3 is a side elevation of the device shown in Fig. 1 with parts disassembled, removed and broken away;

Fig. 4 is an enlarged view of one of the friction devices showing its attachment to fragments of the protective device;

Fig. 5 is an exploded view of the friction device shown in Fig. 4 and showing each component of the friction device in end and side elevation; and

Fig. 6 shows one end of a modified headstrap.

Referring now to the drawings, and particularly to Fig. 1, the protective device 1 comprises a headgear 2

having a crown 4 and visor 6. The headgear may be fabricated by various methods well known in the hatmaking art and composed of various materials having high strength, desirable weight and good liquid-resistant qualities. For example, the headgear may be molded of cellulose fibers reinforced with glass fibers and bonded together with a durable, water-resistant plastic. This provides a headgear which is extremely light in weight and has high strength characteristics and is highly resistant to water, acids and alkalies. Crown 4 of the headgear 2 preferably extends upwardly and over the head of the wearer and generally conforms to the curvature of approximately the front half of the head. The visor 6 extends forwardly of and around the crown 4, as shown, to provide a means for shielding the face from the glare of light and downwardly directed particles and liquid splashes, and provides a means for spacing a faceshield 8 a predetermined distance away from the face for purposes hereinafter explained. The faceshield 8 is attached to the side or temple portions of the crown 4 by friction or connecting devices 10 and is seated on the visor 6 by a stop 12 when the faceshield is in its lowermost position. An elastic headstrap 14 of the headgear is also connected to the crown by the friction devices 10, and a spongelike sweatband 16 is attached to the inside of the crown 4 by integral resilient nibs 18 which are pulled through holes punched in the crown. In order that the faceshield 8 and visor 6 may be in sealing engagement with each other, a flexible gasket 22 is attached to the visor 6 by cementing or the like to press against the upper peripheral surface of the faceshield when in position of use.

Having described the general arrangement and construction of the protective device, attention is now directed to Figs. 2 to 5 of the drawings wherein the various parts of the protective device are more specifically shown. Noting Figs. 2 and 3, it may be seen that the faceshield 8 is spaced forwardly of the face of the wearer to permit ample ventilation to the face and to allow ample room for goggles and eyeglasses if these are to be worn. Further, should the faceshield be struck and pressed inwardly, the blow is prevented from being directly transmitted to the face as would be the case if the faceshield were only spaced a short distance from the face. The faceshield 8 comprises a curved transparent shield or lens 24 reinforced by a band 26 extending around the entire free edge of the shield and comprises an upper mounting band 28 arranged for attaching the faceshield to the headgear at friction devices 10. The reinforcing and mounting bands 26 and 28 may be attached to the shield 24 in any desirable manner, such as by clamping or the like, but if preferred, the band 26 may be omitted. The shield 24 may be of clear or tinted material selected from groups of well-known plastics having qualities, such as high impact strength, resistance to chemical splash, good flexibility and/or noninflammable characteristics. For example, polyvinylchloride compounds are flexible, highly resistant to chemical splashes and are noninflammable; cellulose acetate compounds are flexible and have good impact strength. For some types of operations, it may be desirable to use a faceshield having a wire mesh shield, and such face protection may be readily substituted for the above-mentioned plastic faceshields. The end portions of mounting band 28 contain holes 30 (only one shown, Fig. 3) for receiving the threaded portions 32 of the bolts 33 which are removably inserted through the crown 4. Crown 4 contains flat-sided apertures 34 (only one shown) for the purpose of nonrotatably receiving bolts 33. The faceshield 8 may be pivoted upwardly into any position over the headgear 2 in the direction of the arrows; and as is shown by the dotted lines in Fig. 3,

it is clearly seen that the headgear may be pivoted through an arc exceeding 200 degrees.

Headstrap **14** is formed of elastic fabric and includes a conventional adjusting buckle **15**. Each end of the headstrap has attached therethrough a metal grommet **37** having a round hole **37***a* (only one shown) formed therein. When the headstrap **14** is attached to the crown, a two-portion headband is formed. That is, the crown **4** forms a rigid front portion and the headstrap **14** forms a flexible rear portion. Thus, the wearer is assured frontal protection and support, and is not exposed to an uncomfortable and complex headstrap at the rear of his head as is the case in an all-rigid headband. Furthermore, the elastic headstrap **14** allows more flexibility of adjustment because of the comfortable clinging action of an elastic band to the head.

Referring to Fig. 5, each of the friction devices **10** comprises a headed bolt **33** having a threaded portion **32** which is flattened for insertion in flat-sided aperture **34** of the crown **4**. Spring washer **35**, washer **36** having a flat-sided aperture shaped to fit around portion **32** and knurled nut **38** complete the parts of each of the friction devices **10**.

Figs. 2, 3 and 4 indicate the manner in which the faceshield **8** and elastic headstrap **14** are attached to crown **4** by friction devices **10**. Reference will be made to the manner of attachment to one side of the headgear since the attachment is identical for both sides. First, the portion **32** of bolt **33** is inserted in aperture **34** of crown **4** and then the elements are assembled in the following order. Spring washer **35** is placed around portion **32** and placed adjacent the crown **4**; the aperture **30** on the end of the mounting band **28** is received by portion **32**; washer **36**, having a flat-sided opening similar to the flats of threaded portion **32**, is inserted against the end of band **28**; the aperture **37***a* in the headstrap grommet **37** is received by portion **32** and the grommet is placed alongside washer **36**; and finally, a knurled nut **38** is screwed onto bolt **33**. When the parts have been assembled, it is seen that the bolt **33** and crown **4** are nonrotatably secured relative to each other because of their mating flat-sided portions and that the faceshield **8** and headband **14** are permitted to freely rotate relative to each other and crown **4**.

When nut **38** is tightened, all of the parts shown in Fig. 4 are frictionally assembled relative to each other and washer **35**, due to its resiliency, permits rotational movement of the faceshield without affecting the frictional force applied by the tightening of the nut. Further, when the faceshield is rotated into various positions, it will remain in that rotated position since the nonrotative washer **36** prevents transmission of the faceshield movement to the headstrap or to the nut **38** to loosen the latter. This permits the wearer of the protective device to continually move the faceshield upwardly and downwardly without changing the initial tightening adjustment on the friction device. Also, movement of the faceshield will not influence the position of the headgear since the latter remains fixed on the head of the wearer due to the nonrotatable connection between the bolt **33** and headgear. Thus, once the nuts are tightened, no further adjustment is necessary after any movement of the faceshield. Headstrap **14** is adjusted upwardly and downwardly by merely employing the resiliency inherent in the elastic fabric of the headstrap, but if desired, grommets **37** may be rotated by loosening nut **38**. Due to the large surfaces of grommets **37** pressing against washers **36** and nuts **38**, the grommets cannot be normally rotated so as to loosen nut **38**. Should the grommets be inadvertently rotated, washer **36** will prevent movement of faceshield **8**.

Referring now to Figs. 2 and 3, it is seen that flexible gasket **22** provides a very effective seal between the visor **6** and faceshield mounting band **28** to protect the eyes and face of the wearer from overhead foreign particles and liquid splash. It should be quite apparent that the provision of a seal between the faceshield and visor, and the incorporation of a visor on the headgear permits the wearer to safely operate under conditions heretofore considered impractical, if not altogether impossible, without additional burdensome and expensive safety equipment. Furthermore, should slight inaccuracies occur in the fabrication or assembly of the faceshield or headgear, the resiliency of gasket **22** will readily make up these differences and maintain the required seal. If the gasket **22** becomes worn, it may be replaced by simply cementing a new gasket in place of the worn one.

Fig. 6 shows a modified form of grommet **37**. In this embodiment, the headstrap would have a grommet **50** on each end, and each grommet would contain a flat-sided aperture **50***a* for receiving a flat-sided bolt identical to bolt **33**. When assembled with a friction device identical to the device **10** above, the grommet **50** would function as a nonrotatable element. Accordingly, rotation of the tightening nut would not influence the position of the headstrap.

From the above description, it is obvious that this invention provides a novel protective device which contains all of the necessary qualities required in the performance of above-related operations and provides a protective device whose component parts are readily and inexpensively replaceable and which parts are easily conformable and adjustable to various head shapes and sizes.

Having explained the principle of the present invention and having illustrated and described what is considered to be the best embodiment, it is to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. A protective device comprising a headgear including a crown and a shield pivotally mounted on the crown by a pivotal connection, said pivotal connection comprising a bolt having a head positioned against the inside surface of said crown and having a flat shank portion extending through said crown and shield, the crown having an opening complementary to the flat shank portion, said bolt being nonrotative relative to said crown and providing a pivot for said shield, expansible spring means carried by said flat shank portion between said crown and shield, tightening means carried by said portion outside of said crown, and nonrotative anti-friction means interposed between said shield and tightening means.

2. A protective device comprising a headgear including a crown and a shield pivotally mounted on the crown by a pivotal connection, said pivotal connection comprising a bolt having a head positioned against the inside surface of said crown and having a threaded portion flattened on at least one side extending through said crown and shield, the crown having an opening complementary to said portion, said bolt being nonrotative relative to said crown and providing a pivot for said shield, a spring washer carried on said portion between said crown and shield, a nut threadingly engaging said portion outside of said crown, and a nonrotative anti-friction washer interposed between said shield and nut.

3. A protective device comprising a headband having front and rear portions, a shield pivotally mounted on said front portion by a pivotal connection, said pivotal connection comprising a bolt having a flat shank portion extending through said portions and shield, said front portion having an opening complementary to the flat shank portion, expansible spring means carried by said flat shank portion between said front portion and shield, tightening means carried by said flat shank portion, said rear portion being rotatably carried between said shield and tightening means, and nonrotative anti-friction means interposed between said shield and rear portion, whereby said shield is pivotable without affecting the adjusted position of the rear portion and tightening means.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

2,167,969	Bowers	Aug. 1, 1939
2,169,745	Shipman	Aug. 15, 1939
2,194,492	Bowers	Mar. 26, 1940
2,238,994	Dockson et al.	Apr. 22, 1941
2,360,482	Evans	Oct. 17, 1944
2,421,427	Mamlin et al.	June 3, 1947
2,718,006	Bowers	Sept. 20, 1955

FOREIGN PATENTS

489,730	France	Oct. 26, 1918