

Feb. 27, 1968

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3,370,302

PROTECTIVE SHIELD ASSEMBLY

Filed Feb. 25, 1966

FIG. 1

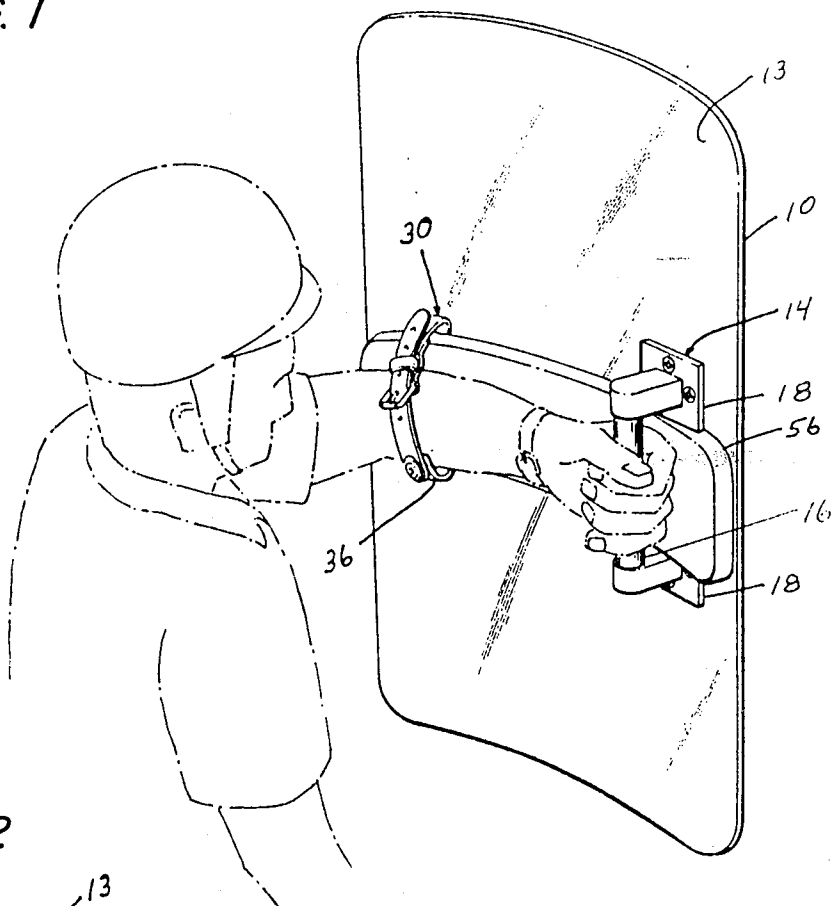


FIG. 2

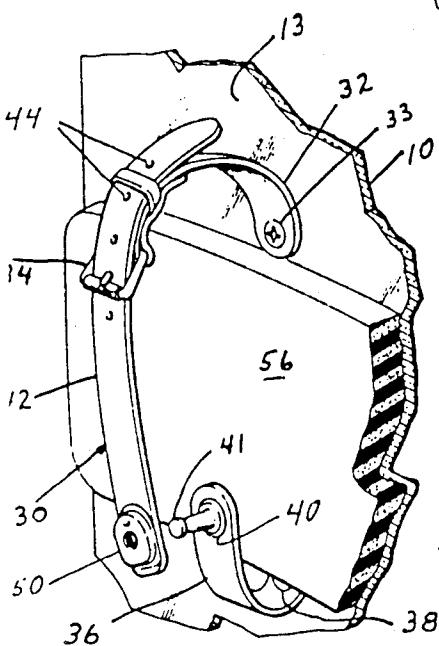


FIG. 3

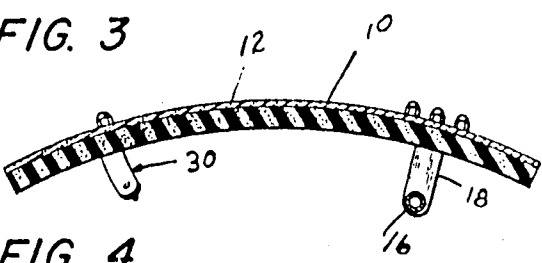
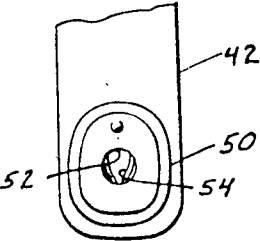


FIG. 4



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PROTECTIVE SHIELD ASSEMBLY

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10 Claims. (Cl. 2—2.5)

The present invention relates to protective devices, and more particularly to a substantially transparent protective shield assembly for use by an individual to ward off bodily injury. Recent riots and other violent events in the United States and abroad have clearly demonstrated the vulnerability of law enforcement officers, military personnel and citizens to injury from clubs, hurled missiles such as stones, bricks and the like, and gunshots as well as to manual blows. These same people are equally vulnerable to injury from the throwing of acids and other irritants which have been used as weapons by persons participating in riots.

It is an object of the present invention to provide a novel protective shield assembly for use by law enforcement officers and others to ward off bodily injury and which is readily manipulated and substantially transparent so as to provide good visibility for the user even when in a position of maximum protection.

It is also an object to provide such a protective shield which is relatively light in weight to minimize fatigue and which has a very high degree of resistance to impact stresses and a high degree of transparency with substantial freedom from optical distortion.

Another object is to provide such a protective shield which may be readily and economically manufactured and which is simple to utilize and to maintain.

Still another object is to provide such a protective shield from which the user may readily release his arm if the shield is gripped by an adversary and which affords substantial cushioning against impacts.

Other objects and advantages will be readily apparent from the following detailed specification and the attached drawing wherein:

FIGURE 1 is a perspective view of the protective shield assembly embodying the present invention being utilized by a law enforcement officer fragmentarily illustrated in phantom line;

FIGURE 2 is a fragmentary perspective view of a portion of the protective shield assembly of FIGURE 1 to an enlarged scale with the releasable coupling in open position;

FIGURE 3 is a transverse cross-sectional view thereof; and

FIGURE 4 is a fragmentary plan view to an enlarged scale of a portion of a strap showing one releasable coupling element.

It has now been found that the foregoing objects and other advantages can readily be attained in a protective shield assembly for use by an individual which includes a substantially transparent shield of relatively high impact-resistant synthetic plastic material having a generally curvilinear cross section providing a concave inner surface. Arm-engageable means is mounted on the inner surface of the shield member for supporting engagement with the arm of the user and includes a releasable retaining assembly adjacent one side of the shield member for encircling the upper forearm of the user and releasable by a force acting to pull the shield member away from the arm of the user so as to free his arm therefrom. Holding means is provided adjacent the other side of the inner surface of the shield member for engagement with the lower arm of the user for facile manipulation and positioning of the shield assembly.

Although various synthetic plastic materials exhibit

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relatively high impact resistance such as blends of styrene-acrylonitrile-butadiene, blends of styrene-acrylate-butadiene, and high density polyethylene, polycarbonates have proven especially advantageous for the present invention because of their very high impact strength and highly desirable optical properties as well as their retention of impact strength even at temperatures below 0° centigrade. Polycarbonate sheet material may be readily thermo-formed into simple curvilinear configurations without producing excessive internal stresses and affords a relatively lightweight member which may be solvent or flame polished to restore substantially its optical clarity after scratching and other minor abrasions. Generally, polycarbonate sheet material employed for this purpose should be about .060-.167 inch in thickness.

The shield may be a single thickness of sheet material or it may be a laminate of several layers of the same or dissimilar sheet materials. If so desired, it may include metallic or other inorganic layers which do not unduly reduce visibility.

By the provision of a transparent shield, the user may observe his surroundings without obstruction and yet have full protection for his head and upper body. The transversely curvilinear configuration with the concave inner surface increases the degree of protection for his arm supporting the shield and also increases the total resilience of the shield and its ability to withstand objects by deflecting them.

The strap is made of flexible material such as leather, rubber, plastic and the like and is preferably adjustable in length to provide a snug fit on the user's arm. The releasable connecting means is most desirably a pull-out type snap connector which will release upon the application of a predetermined force. The snap connector has a post with a head of greater width than the shank and a snap retainer having an aperture therein receiving the post and resiliently deformable spring means engaged with the shank behind the head to maintain the post in engagement upon application of a strong force. The head which has camming surfaces on its outer and inner ends cams the spring means to release the head from the aperture. The strap is preferably comprised of three parts, two parts having end portions attached to the shield and their opposite end portions attached to the third part by means of an adjustable buckle and the releasable snap connector. The buckle provides a convenient means for adjusting the retaining means to fit the size of the arm of each particular user.

By providing the releasable retaining means, it is possible for the user to release himself from engagement with the shield when an adversary attacking or resisting the user grasps the shield and attempts to pull or push the user off balance therewith. When the shield is being held by an attacker, the user may release his hold on the hand grip and pull his arm away from the shield to cause release of the connecting means and disengagement of the user's arm from the shield assembly so that the user is freed therefrom.

The holding means is preferably a rigid hand grip mounted on the inner surface of the shield for manual retention by the user for facile manipulation and positioning of the shield assembly. A cushion of resilient material such as foam rubber is provided on the inner surface of the shield and extends between the retaining assembly and the holding means to cushion the user's arm against the impact of blows delivered to the outer surface of the shield. Preferably, the cushion extends well beyond the retaining assembly and holding means to provide maximum shielding for the user's arm.

Referring now in detail to the attached drawing, a protective shield assembly embodying the present invention

includes a substantially transparent shield 10 of highly impact-resistant synthetic plastic material which has a generally arcuate transverse cross section forming an impact or outer surface 12 and a concave inner surface 13. A hand grip, generally designated by the numeral 14, is fixedly mounted on the inner surface 13 adjacent one side of the shield 10 and has a handle portion 16 supported by a pair of mounting brackets 18 which are rigidly connected to the shield 12 by means of fasteners 20.

A releasable retaining assembly, generally designated by the numeral 30 is mounted on the inner surface 13 adjacent the opposite side of the shield and has a flexible strap 32 which is fixedly attached at one end thereof to the shield 10 by means of the fastener 33 and has a conventional buckle 34 attached to the opposite or free end thereof.

A second flexible strap 36 is fixedly secured at one end thereof to the shield 10 by means of the fastener 38 and has an outwardly projecting post or pin 40 mounted on the opposite or free end thereof that has a head 41 of greater width than its shank. A third flexible strap 42 has a series of longitudinally spaced apertures 44 on one end thereof for adjustable engagement with the buckle 34 in the usual manner. At its other end, as best seen in FIGURE 4, the strap 42 has a releasable snap retainer 50 which has an aperture 52 therein and a resiliently deformable spring wire 54 positioned so as to extend on opposite sides of the aperture 52 and releasably retains the head 41 of the pin 40 when the post 40 is disposed in the aperture 52. The straps 32, 36 and 40 are made of flexible material such as leather, rubber, plastic or the like.

A cushion of resilient material 56 such as foam rubber is attached on the inner surface 13 of the shield 10 and extends between the hand grip 14 and the releasable retaining assembly 30 and therebeyond to the sides of the shield in order to act as a shock absorber to protect the arm and hand of the user against the impact of blows that may be delivered against the outer surface 12 of the shield 10.

To employ the shield assembly the user inserts his arm through the loop provided by the releasable retaining assembly 30, and manually grasps the handle portion 16 of the rigidly mounted hand grip 14. The effective length of the strap 42 may be adjusted to the girth of the user's arm by means of the buckle 34 so as to provide firm engagement to support the shield assembly in the manner illustrated in FIGURE 1. Although the spring wire 54 is sufficiently rigid to hold the head 40 securely in the aperture 52 during the normal manipulation of the shield assembly, a predetermined force applied to pull the shield away from the user will cause the head 41 to expand the wire 54 and effect release therefrom, thus freeing the arm of the user.

Accordingly, the protective shield assembly of this invention provides a protective shield for law enforcement officers and others to enable them to ward off bodily injury and which is substantially transparent and is readily releasable by the user. The transparent shield provides full viewing by the user of the surrounding area and of attacking persons and hostile missiles coming his way, and its light weight and the holding means make it possible for the user to quickly place the shield in a protective position. The releasable means enables the user to readily abandon the shield assembly when an attacker grasps it and attempts to throw the user off balance or drag him thereby.

The protective shield provided by this invention is durable in construction, transparent with substantial freedom from optical distortion and is easy to maintain.

Having thus described the invention, I claim:

1. A protective shield assembly for use by an individual comprising: a substantially transparent shield of relatively high impact-resistant synthetic plastic material, said shield having a generally curvilinear transverse cross section providing a concave inner surface; and arm-engageable

means mounted on said inner surface of said shield including a releasable retaining assembly for encircling the upper forearm of the user, said retaining assembly being releasable by a force acting to pull said shield away from the arm of the user to free his arm therefrom, and holding means for engagement by the lower arm of the user for facile manipulation and positioning of said shield assembly.

2. The protective shield assembly of claim 1 wherein said synthetic plastic material is polycarbonate.

3. The protective shield assembly of claim 1 wherein said releasable retaining assembly comprises a pair of flexible straps mounted on said inner surface of said shield and resiliently coupled releasable connecting means on overlapping ends of said straps, said connecting means being releasable by a force acting to pull said shield away from the arm of the user.

4. The protective shield assembly of claim 1 wherein said holding means is a rigid hand grip mounted on said inner surface of said shield.

5. The protective shield assembly of claim 1 wherein said arm-engageable means includes a cushion of resilient material on the inner surface of said shield extending between said retaining assembly and holding means to cushion the user's arm against impacts.

6. The protective shield assembly of claim 3 wherein said connecting means comprises a post with a head of greater width than its shank on one of said straps and a snap retainer on the other of said straps having an aperture receiving said headed post and resiliently deformable spring means engaged with said shank of said post.

7. A protective shield assembly for use by an individual comprising: a substantially transparent shield of relatively high impact-resistant synthetic plastic material, said shield having a generally arcuate transverse cross section providing a concave inner surface; a releasable retaining assembly mounted on said inner surface of said shield for encircling the upper forearm of the user, said retaining assembly including a flexible strap and resiliently coupled releasable connecting means releasable by a force acting to pull said shield away from the arm of the user; a rigid hand grip mounted on said inner surface of said shield for manual retention by the user for facile manipulation and positioning of said shield assembly; and a cushion of resilient material mounted on said inner surface of said shield and extending between said retaining assembly and said hand grip to cushion the user's arm against impacts.

8. The protective shield assembly of claim 7 wherein said synthetic plastic material is polycarbonate.

9. The protective shield assembly of claim 7 wherein said flexible strap of said retaining assembly is comprised of a pair of strap elements secured at one end to said shield and having their other ends overlapping and wherein said connecting means comprises a post with a head of greater width than its shank on one of said overlapping ends and a snap retainer on the overlapping end of the other of said straps having an aperture receiving said headed post and resiliently deformable spring means engaged with said shank of said post.

10. The protective shield of claim 7 wherein said cushion extends transversely of said shield beyond said retaining assembly and said hand grip.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,370,302

February 27, 1968

Albert A. Karlyn

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the printed specification, lines 3 and 4, for "Albert A. Karlyn, 81 Ridge Road, Wethersfield, Conn. 06109" read -- Albert A. Karlyn, Wethersfield, Conn., assignor to Rowland Products, Incorporated, Kensington, Conn., a corporation of Connecticut --.

Signed and sealed this 6th day of May 1969.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer


Commissioner of Patents