

[54] NON-FOGGING FACE SHIELD

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; a part interest[22] Filed: **Mar. 21, 1973**[21] Appl. No.: **343,523****Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 327,211, Jan. 26, 1973, abandoned.

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[51] Int. Cl. A61f 9/00

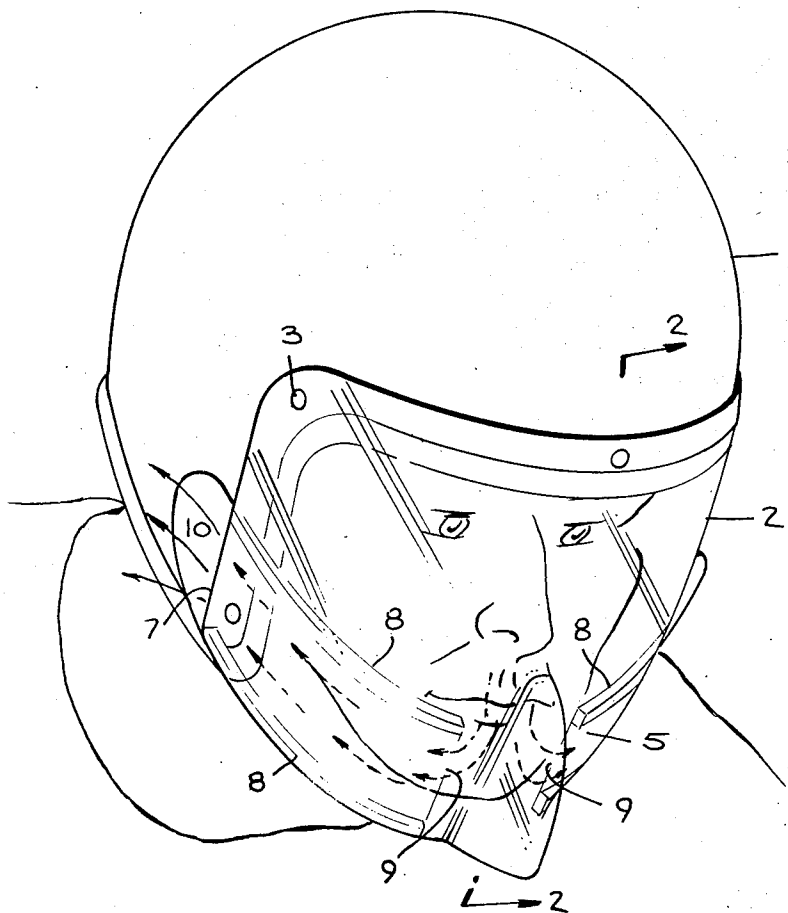
[58] Field of Search 2/3 R, 5, 6, 9, 10, 8,
2/14 K[56] **References Cited****UNITED STATES PATENTS**

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Primary Examiner—James R. Boler[57] **ABSTRACT**

A transparent protective face shield (or mask), having one or more exhaust ducts, each of which has an intake opening in or upon the inner surface of the shield in the region generally opposite the wearer's nostrils and mouth, and a confined passage extending from said intake opening laterally along either the inner or outer surface of the shield in the direction of an edge thereof to a discharge opening in or upon the exterior surface of the shield and so positioned that an external airstream, caused by relative motion of the wearer and the surrounding air, passes over or across such discharge opening, whereby said external airstream imposes an aspiratory suction upon the duct which withdraws air from beneath the shield in front of the wearer's face and discharges such air into such external airstream.

2 Claims, 4 Drawing Figures

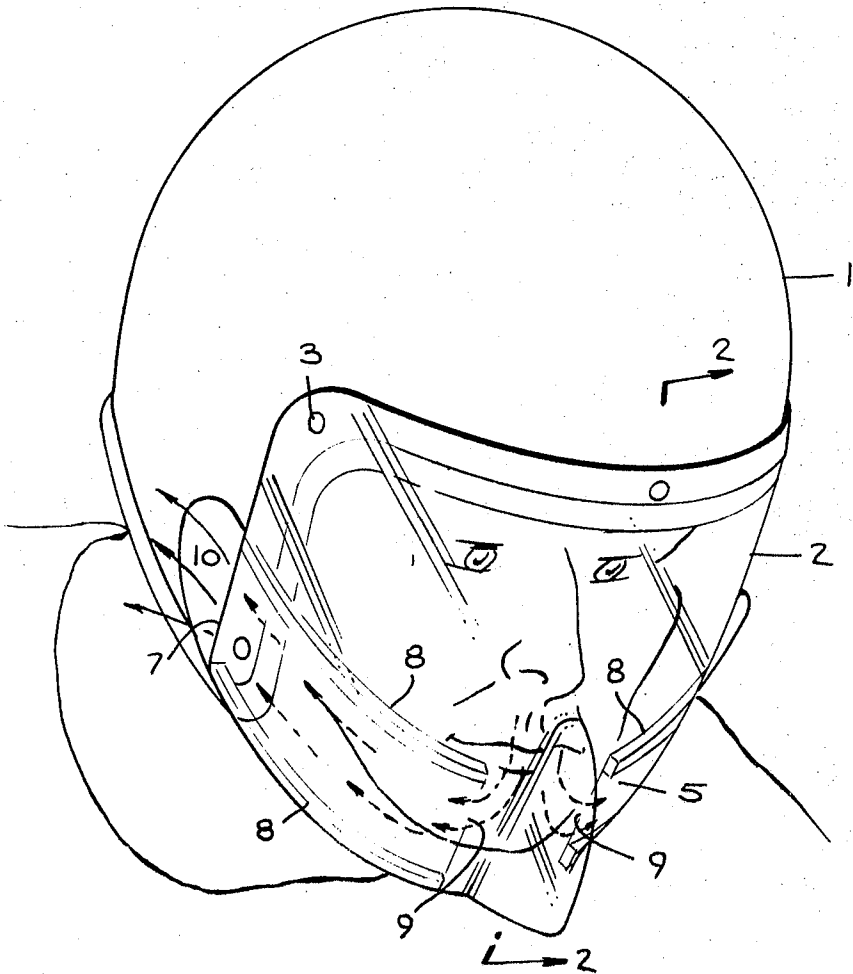
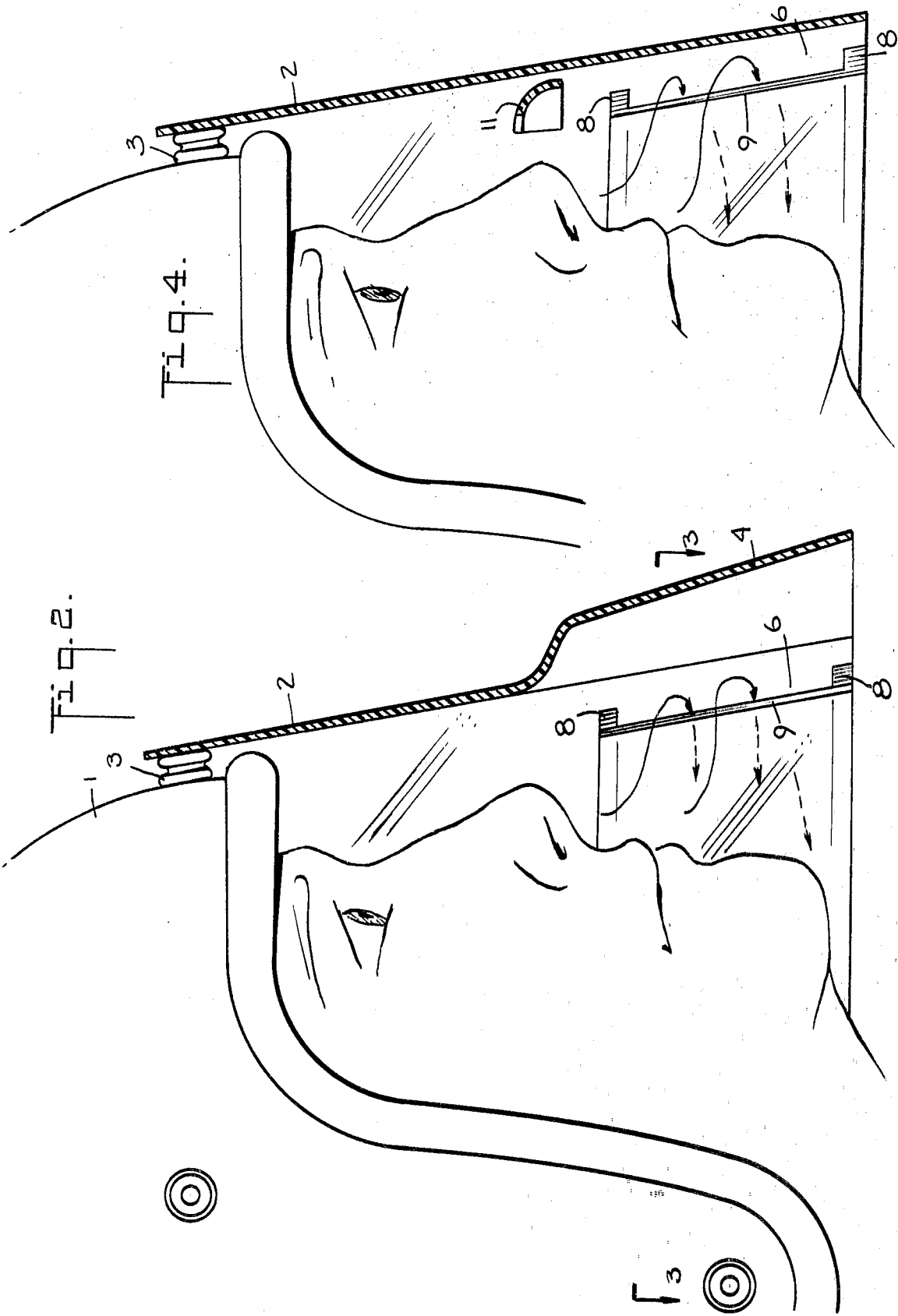


Fig. 1.



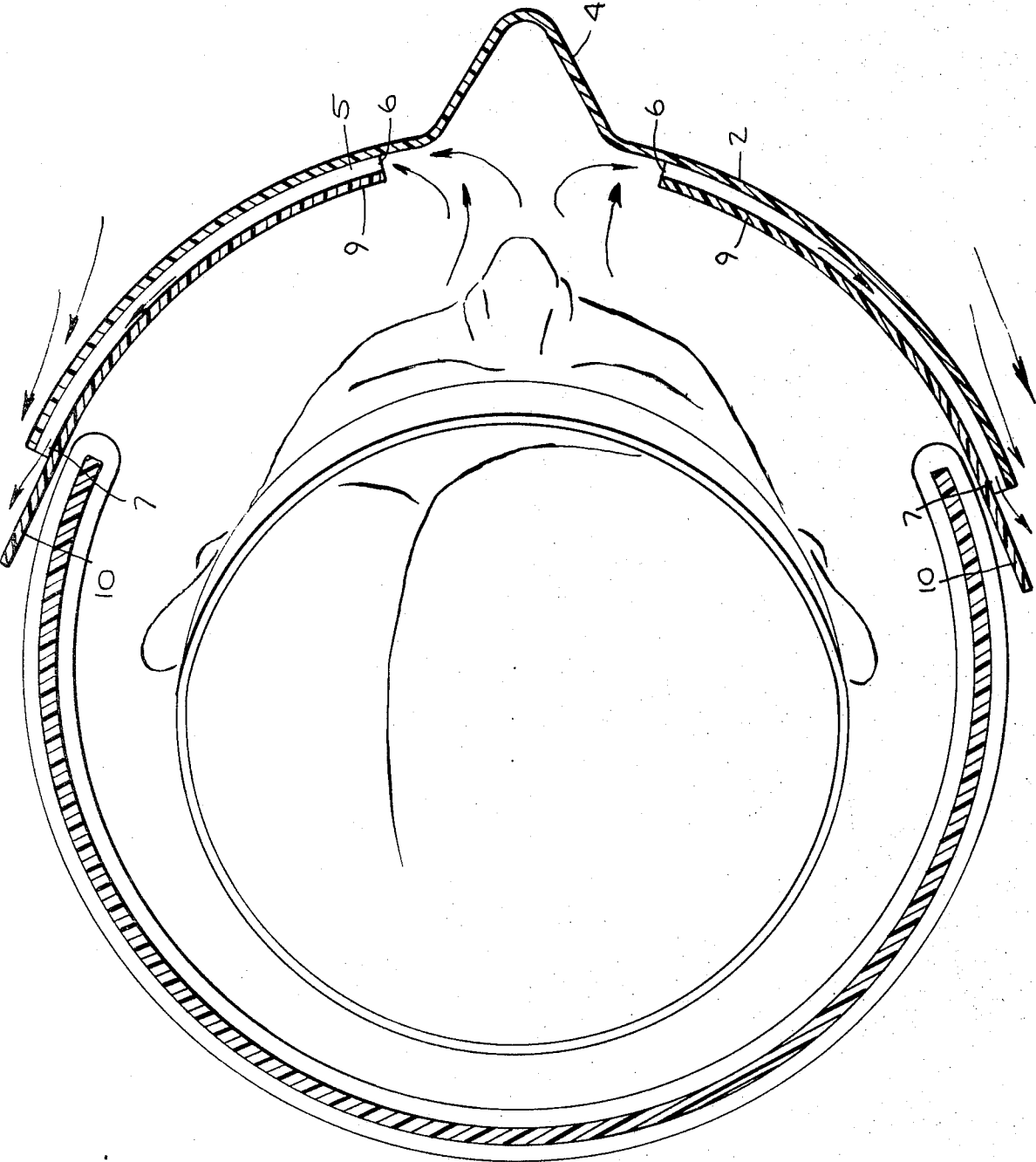


Fig. 3.

NON-FOGGING FACE SHIELD

This application is a continuation-in-part of my co-pending application Ser. No. 327,211 filed Jan. 26, 1973 now abandoned.

This invention relates to transparent protective face shields of the type worn, usually in conjunction with a helmet, by motorcyclists, snowsledders (snowmobilers), race car drivers and others engaged in activities which expose the face to strong onrushing airstreams. I have discovered a simple, novel and extremely effective means for minimizing (and in most instances, preventing) fogging of such shields.

Face shields of the type with which my invention is concerned are made of transparent plastic material, are cylindrical, rounded, or otherwise so shaped as to present a more or less streamlined surface to the onrushing airstream, and extend downwardly from the region of the forehead (or the frontal edge of the helmet, if worn) to cover and protect the eyes and part or all of the remainder of the face. The extremely annoying, and often uangerous, tendency of the wearer's breath to fog the inner surface of such shields, particularly in cold weather, with resultant impairment of vision is well known to snowsledders and others who wear them.

Heretofore this fogging problem has been attacked, inter-alia, (a) by avoidance, i.e., shaping the lower portion of the shield so as to leave uncovered the wearer's nostrils and mouth, and (b) by applying so-called antifogging chemical coatings to the inside of the shield. The first of these attempted solutions leaves a large part of the face unprotected, and the second is both troublesome and of only temporary effect. In spite of all attempts to solve it, the fogging problem continues to plague the art.

My solution to the fogging problem is to incorporate into the structure of a face shield of the type heretofore described, one or more ducts, or passages, each of which has an intake opening in or upon the inner surface of the shield in the region generally opposite the wearer's nostrils and mouth, and a confined passage extending from said intake opening laterally along either the inner or outer surface of the shield in the direction of an edge thereof to a discharge opening communicating with the exterior of the shield and so positioned that an external airstream, caused by relative motion of the wearer and the surrounding air passes over or across such discharge opening, whereby said airstream imposes an aspiratory suction upon the duct which draws breath-laden air from the region within the shield surrounding the wearer's nostrils and mouth and discharges such air into said airstream.

While one such exhaust duct will function to evacuate air from beneath the shield, a pair of right and left ducts is preferred so that when the wearer turns his head to the side one duct remains in position to function relative to the onrushing airstream.

Efficiency of the exhaust ducts can be improved by providing the interior of the face shield with means for directing or deflecting the breath into the exhaust ducts and preventing it from escaping upwardly beneath the mask to the region of the eyes, where it may cause fogging.

Efficiency is further improved by shaping the upper edge of the shield to conform as closely as possible to the adjacent surface of the helmet, thus minimizing any tendency of the air beneath the shield to flow upwardly

and out at the top, carrying the breath to the upper region of the shield.

The exhaust duct preferably has a long, thin cross-section, and utilizes a surface of the shield itself for one of its sides. It can be enclosed on its remaining three sides by two more or less parallel ridges molded integrally with the shield and a flat sheet or strip of transparent plastic material bridging such ridges. Use of transparent materials minimizes obscuration of the wearer's vision.

Further understanding of my invention will be aided by reference to the accompanying schematic drawings, in which:

FIG. 1 is a pictorial view of one embodiment of the face shield of my invention shown attached to a helmet in position upon the head of a person;

FIG. 2 shows a vertical cross-section of the shield of FIG. 1 taken along line 2—2; and

FIG. 3 shows a horizontal cross-section of the shield depicted in FIG. 1 taken along line 3—3; and

FIG. 4 shows a vertical cross-section, in the plane of FIG. 2, of a shield embodying my invention having a different means for deflecting the wearer's breath into the region of the exhaust duct intake openings.

In each of the figures like reference numbers designate the same element. Numeral 1 indicates an open-faced helmet of conventional design. Numeral 2 indicates a transparent face shield attached to helmet 1 by snap fastenings 3. Shield 2 covers substantially the entire area of the face left uncovered by helmet 1, down to the chin, thus affording maximum protection. Shield 2 has a pair of exhaust ducts 5 extending laterally to the right and left along its inner surface from inlet openings 6 located in the region generally opposite the wearer's nostrils and mouth to discharge openings 7 at the side edges of shield 2.

In the embodiment shown, each exhaust duct 5 is of shallow, rectangular cross-section, measuring about onequarter inch in depth by about one and one-half inches in width throughout its length. Each duct is formed and enclosed by the inner surface of the shield itself, a pair of generally parallel ridges 8, which may be formed integrally with or attached to the inner surface of the shield, and a sheet of transparent plastic material 9 bridging said ridges 8.

As shown, each plastic sheet 9 has an extension 10 which protrudes rearwardly beyond the side edge of shield 2 for a distance of one or one and one-half inches. This extension serves to increase the aspiratory effect upon duct 5 of the external airstream flowing past the edge of the shield and discharge opening 7, and, at the same time, inhibits air turbulence at the side edges of the shield.

As shown in FIGS. 1, 2 and 3, shield 2 has a nose-shaped depression 4, located in front of the wearer's nostrils and mouth, the purpose of which is to aid in directing the wearer's breath into the inlet openings 6 of exhaust ducts 5.

As shown in FIG. 4, a transverse, inwardly protruding deflecting member 11, preferably made of yieldable resilient material, may be affixed to the inside surface of shield 2 at a point above and between the exhaust duct intake openings 6 as a substitute for a depression in the shield itself. Deflector 11 may be secured to the inner surface of the shield by any convenient means, or may be molded integrally with the shield. Use of either breath-collecting indentation 4 or breath deflector 11,

and side extensions 10, greatly increases the efficiency of the shield, but their use is not essential to the basic operability of the shield.

Instead of forming exhaust ducts 5 on the inner surface of the shield as shown in the drawings, they may be formed on the shield's outer surface, in which case their intake openings would penetrate the shield itself and their discharge openings could be located somewhat forwardly of the shield's side edges.

Although depicted in the drawings in conjunction with an open-face helmet, my invention is readily adaptable to the newer, so-called racing helmet, which completely surrounds the wearer's head down to or below the chin and has an oblong vision opening in front of the wearer's eyes and upper face. In such a helmet the lower front portion below the vision opening functions as a partial face shield, and the opening itself may be covered by a sheet of transparent plastic material for complete protection. In a helmet of such type the exhaust ducts of my invention may be incorporated in the lower front portion of the helmet. Alternatively, the transparent shield which covers the vision opening may be extended laterally beyond the right and left edges of the opening, and exhaust ducts may be formed between the lateral extensions of the shield and the underlying temple areas of the helmet by incorporating parallel upper and lower ridges in the inner surfaces of such extensions. These ridges, together with the side extensions of the shield and the underlying surfaces of the helmet, form exhaust ducts leading from the side edges of the vision opening rearwardly to the ends of the shield extensions. The flow of an external airstream around the sides of the helmet and across the ends of the shield extensions will create a suction within these

ducts which, in turn, will evacuate air from within the helmet under neath the shield.

Use of my invention, particularly in conjunction with the aforementioned racing type helmet, not only prevents fogging but also aids in circulating fresh air from below the lower and/or side edges of the shield into the area beneath the shield in front of the wearer's face and thence out through the exhaust ducts, thereby increasing the wearer's comfort, even in circumstances in which fogging presents no immediate problem.

What is claimed is:

1. In a face shield, the improvement comprising a pair of aspirating exhaust ducts for the withdrawal of breath-laden air from the interior of said shield each of said exhaust ducts having an intake opening in or upon the inner surface of said shield generally in front of the wearer's nostrils and mouth, a confined passage extending substantially laterally from said intake opening to a discharge opening located adjacent an edge of said shield and an inner sidewall extending rearwardly beyond said discharge opening.

2. In a helmet having attached thereto a protective face shield, the improvement comprising a pair of aspirating exhaust ducts for the withdrawal of breath-laden air from the interior of said helmet and shield each of said exhaust ducts having an intake opening communicating with the interior of said helmet and shield and an enclosed passage extending substantially laterally from said intake opening to a discharge opening communicating with the exterior of said helmet and shield, a portion of the exterior surface of said helmet extending rearwardly beyond said discharge opening.

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