



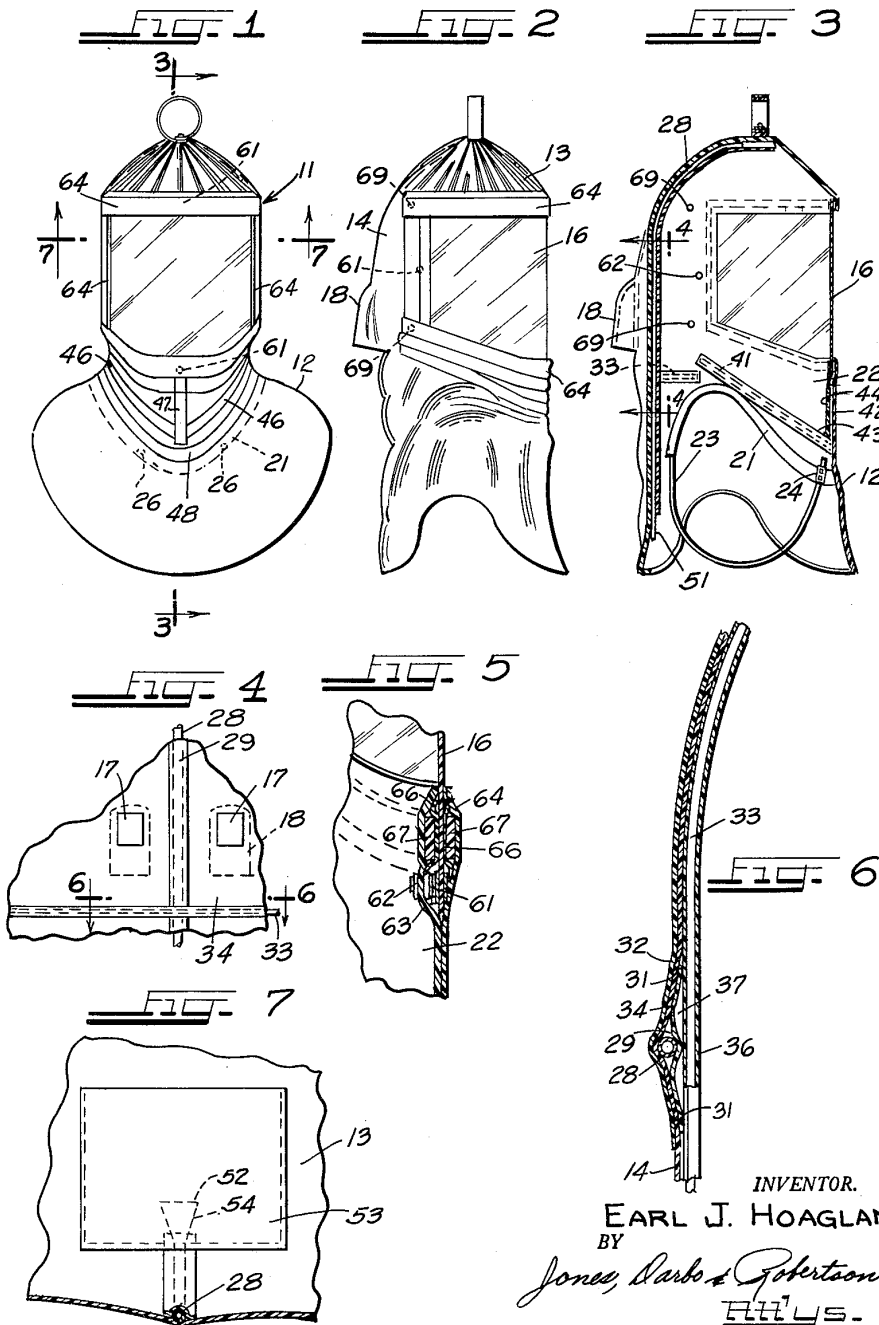
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SHOULDER-MOUNTED SAFETY HOOD

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### SHOULDER-MOUNTED SAFETY HOOD

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Before the present invention, safety hoods designed to protect a worker's head from splashing by acids, caustics or the like, have usually been supported on the head. This has been the cause of some discomfort, and, more important, has impeded the movement of the wearer's head.

Usually the wearer is also wearing a protective coverall which must be overlapped by the protective hood so that there is appreciable rubbing between the hood and the lower garment as the head turns. Forward bending of the wearer's head is similarly impeded, and tends also to be limited by the danger that the hood may slip from its proper place on the head.

According to the present invention, the hood though light weight and largely flexible, is mounted on the wearer's shoulders. This presented some problems of providing comfortable and inexpensive support for holding the generally flexible hood free of the head within it.

The freedom of the head to turn, which is made possible by the shoulder mounting, has presented a severe problem of visibility. Heretofore it has been sufficient to provide a moderately wide transparent window, directly in front of the head, on which the hood was mounted. If the wearer turned his head, the window moved too. The new freedom of the head to turn without turning the hood makes it desirable to extend the window far enough rearwardly on each side so that the vision will be substantially unobstructed when the head turns. Similarly, a greater vertical extent of the window, especially in front, becomes more desirable. This is partly because the wearer's head may be positioned higher or lower depending on the length of his neck and the set of his shoulders, and partly because he has considerable ability to bend his head forwardly within the helmet which lowers his eye level and is usually accompanied by a desire to see something at or near floor level.

The enlarged new window presents problems of providing a sufficient seal between the window and the body of the hood, especially inasmuch as the ready replaceability of the window is highly desirable.

According to the present invention, these various problems have been satisfactorily solved. The hood is supported from the shoulders with minimum weight by the aid of a few stiffening members which are so designed that they do not add excessively to the cost, and do not cause discomfort. The window is extended well beyond half way from front to rear, and its bottom edge dips from the ends (which are over the shoulders) to the central portion. Satisfactory sealing in spite of the size and shape of the window is attained with the aid of flexible magnetic stripping. If protection from obnoxious gases is desired, one of the stiffening members can comprise a tube for conducting compressed air to the top of the hood. This not only provides air for the wearer to breathe, but provides a flow of air outwardly through all areas where otherwise the surrounding obnoxious gases might enter.

Additional objects and advantages will be apparent from the following description and from the drawings.

#### Designation of Figures

FIGURE 1 is a front view of a hood chosen for illustration of the present invention.

FIGURE 2 is a side view of the hood shown in FIG. 1.

FIGURE 3 is a vertical sectional view taken approximately along the line 3—3 of FIG. 1.

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FIGURE 4 is a fragmentary view showing details of the braces and vents, being taken approximately along the line 4—4 of FIG. 3.

FIGURE 5 is a fragmentary sectional and partially perspective view on a scale considerably larger than that of FIGS. 1 to 3, showing details of the construction designed for sealing around the edges of the transparent window.

FIGURE 6 is a fragmentary horizontal sectional view taken approximately along the line 6—6 of FIG. 4, showing especially the concealment and securing of the bracing.

FIGURE 7 is a fragmentary view partly in section, along the line 7—7 of FIG. 1, looking upwardly at the top of the hood to show the air liberation features thereof, which are preferably provided when protection from obnoxious gases may be desired.

#### General Description

Although the following disclosure offered for public dissemination is detailed to ensure adequacy and aid understanding, this is not intended to prejudice that purpose of a patent which is to cover each new inventive concept therein no matter how others may later disguise it by variations in form or additions or further improvements. The claims at the end hereof are intended as the chief aid toward this purpose; as it is these that meet the requirement of pointing out the parts, improvements, or combinations in which the inventive concepts are found.

The illustrated form of shoulder-mounted safety hood includes a head hood 11 and a flounce 12 extending from the bottom thereof and serving a dual purpose of support from the shoulders and of overlapping a protective garment worn by the worker from the shoulder down. The head hood 11 includes a crown 13, a back 14 and a transparent window 16, which in the present commercial form is a plastic sheet which can be flexed to the shape shown. The unusually large size of the window 16 and its shape, extended downwardly in its central region, is one of the features of the preferred form of this invention, but makes the problem of sealing more difficult. This difficulty is solved by other features of the invention.

The back 14 may include vent openings 17, although usually no such openings will be provided if air is to be liberated within the hood. If the vent openings 17 are provided they will be provided with small hoods 18 sealed to the back 14 all around the openings 17 except for being open at the bottom of the hood 18 which is spaced substantially below the vent openings 17, to prevent harmful liquid from entering through the vents 17.

#### Shoulder Mounting

Preferably a yoke band 21 or "horseshoe" is provided which rests on the shoulders of the worker. This yoke band may conveniently be continuous with the material of the body portion 22 of the head hood, extending below the point where it is joined to the flounce 12. The yoke band 21 is desirably reinforced with an extra layer of the flexible material. It has been found not to need a stiffening member. In the illustrated form, the yoke band extends across the chest and up over each shoulder and down behind the shoulders but not across the back. From each end of the yoke 21, there extends, a retaining strap 23. After the worker dons the mask, he may pull the forward end of the strap under his arm and up to snap it to the yoke 21. Preferably the strap 23 has a buckle 24 adjustably positioned on the strap 23 and provided with one half of a snap fastener, the other half of which is secured on the yoke 21 as indicated at 26 in FIG. 1.

#### Bracing

The back part of the hood is held upright over the head by means of a backbone brace 28, the full length



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of which is seen in FIG. 3. The brace 28 is secured along the back 14 and the back of the crown 13 by tape 29. This tape is secured to the body material by a line of stitches along each side, and preferably also is adhered to the body material. In FIG. 6 the stitches are in this instance represented at 31. All stitches are externally sealed by a seal tape 32 which is adhered to the body material, preferably by heat sealing. All similar internal tapes are likewise sewn along both edges and sealed externally, although in most instances these details have been omitted from the drawings since they would be confusing. Likewise, external sealing tape is used at all other places where stitches join parts, or otherwise pierce the material of the body, except at the bottom hem. For example, there are such stitches, sealed by an external tape, for the flaps 64 later to be described.

The weight of the head hood is transferred from brace or stay 28 to a transverse brace or stay 33 without any rigid joining of these two braces. This is accomplished by the body material 34 especially in the vicinity of the crossing of the two braces. Although the transverse brace 33 can be secured to the material 34 with a tape in the same manner as brace 28, the crossing of the braces presents a special problem. If tape were to be used for securing transverse brace 33 it would probably be omitted in the vicinity of backbone brace 28, but this would leave brace 33 exposed and raise questions of its possibly becoming corroded. Preferably therefore the entire length of transverse brace 33 is enclosed within a tube 36 of flexible material, and this tube is sewn above and below the transverse brace 33 the same as a tape would be, the stitches being omitted from the area 37 near the backbone brace 28 where it would be difficult to draw the material together.

Transverse brace 33 preferably does not rest directly on the shoulders, as that might cause discomfort. Its load is transmitted over the shoulder areas in part by a brace or stay 41 over each shoulder. As seen best in FIG. 3, each brace 41 extends from just over the end of brace 33 forwardly and downwardly and around almost to the middle of the front portion of the hood. These braces also receive load from a small forward brace or stay 42 which helps support the forward portion of the hood. The brace 41 is secured by a tape 43, and a brace 42 is secured by a tape 44. Again, the braces are preferably not directly engaged with one another but the load is transmitted from one to the other flexibly through the body material reinforced by the internal tapes and external sealing tapes. The external sealing tapes in question in this instance are shown in FIG. 1. Sealing tape 46 seals the stitches used for holding tape 43 and sealing tape 47 seals the stitches for tape 44.

An outer sealing tape 48 is also shown in FIG. 1. This tape seals the stitches joining the flounce 12 to the head hood 11, at the root of the yoke 21.

#### Air Discharge

Although the backbone brace 28 may be a solid rod, as are the other braces, it has been illustrated in the form of a tube. The lower end 51 of the tube is free so that an air hose may be attached to it. As best seen in FIG. 7 the upper end of the tubular brace 28 has an open end 52 which is preferably located inside of a pocket 53 sewn on the inside of crown 13. If desired, the tube 28 may be flared laterally as seen at 54 for greater comfort above the head (although it will not ordinarily touch the head) and preferably providing an enlarged aperture for silencing the outflow of air. The pocket 53 also helps reduce the hiss of the air as it escapes.

If the vents 17 are provided and the air is supplied through tube 28, it is preferable that the vent 17 be sealed over so that the air would be forced out through the bottom of the hood, and a positive pressure would

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be provided around the periphery of the transparent window.

#### Securing and Sealing of Replaceable Window

In hoods of this type it is important to be able to replace the windows readily. Transparent plastics from which such as these windows are at present made are easily damaged. Most users prefer to replace the windows as soon as the visibility is noticeably impaired.

The main securing of the flexible transparent window sheet 16 is by means of four snap fasteners. One half 61 of each snap fastener is secured to the sheet 16 and the other half 62 is secured to a flap 63 on the inner side of the sheet 16, all as seen best in FIG. 5. The flap 63 may be the continuation of the body material 22. Preferably these snap fasteners are located at the center of each of the four sides (the two sides and the top and bottom of the window). The most important two or them are shown in broken lines in FIG. 1. The other two are shown in FIGS. 2 and 3 respectively. FIG. 3 shows in full lines the inside fitting 62.

It is important that the window 16 be substantially sealed all around its periphery. This can sometimes be accomplished by a member under tension drawn around the convex curvature of the plastic window. However, with the bottom line of the window in this instance depressed at its center portion, sealing of this type is not practicable. The problem has been solved in this instance by using a pair of flexible magnetic strips as seen best in FIG. 5. Strips of this nature are already known and available. One is secured all along the peripheral length of the inner flap 63 and the other is secured all along the peripheral length of an outer flap 64 which is sealed to the body material 22 beyond the area of the window 16. These magnetic strips may be secured by thin films 66 of plastic material heat-sealed to the flaps 63 and 64. The two magnetic strips 67 are available with transverse magnetization and they should be disposed with magnetic opposition to one another so that they will attract one another through the films 66 and the sheet 16, thereby clinging tightly to the sheet 16.

It is not intended that this seal be gastight at all points of the periphery. It is enough that it be so nearly so that splashed liquid cannot find its way inside of the hood and also, so that if gas protection is desired, the air supply through tube 28 will find so little chance to escape that a slight positive pressure will be maintained inside the hood and air will flow outwardly at any point of communication between the inside of the hood and the outside.

To minimize the entry of splashing it is preferred that the outer flap 64 be preshaped to curl toward the sheet 16 at the lip of the flap as seen in FIG. 5.

The upper and lower flaps 64 preferably lie over the end flaps 64, and are provided with snap fasteners 69 at their ends. Upon separating the snap fasteners 69, all four flaps may be folded out for facilitating insertion of the transparent sheet 16. The transparent sheet 16 can be inserted without too great difficulties, however, even if the ends of the flaps are permanently secured.

As seen from FIG. 3, the window represented by transparent sheet 16 extends back approximately to about the middle of the shoulder, or the highest point of yoke 21. With slightly less perfect use of the invention, the window might extend only approximately midway from front to rear of the hood. With less extent than that, visibility would be objectionably impaired upon turning the head within the hood.

The hood may be made of any material suitable for the intended use of a particular hood including, for example, any materials used for somewhat comparable hoods other than those including this invention. Although the drawing has illustrated the body material 22 as being plastic, a plastic coated woven fabric is preferred. Preferably the fabric is also impregnated with the coating material or other chemically resistant material. The ex-



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act coating material will depend upon the hazard, but ordinarily the coating material should be resistant at least to strong alkalis and to common acids including hydrochloric, nitric and sulphuric, and to most hydrocarbons and amines and hydroxy compounds. The material should be self-extinguishing in that it will not support its own combustion at normal temperatures. The fabric can be glass cloth for still greater fire resistance and tear resistance.

From the foregoing, it is seen that a shoulder supported safety hood is provided which is light in weight, comfortable, provides good visibility when the head turns independently of the hood, is economical to manufacture, and which, if desired, can be equipped for soft diffusion of air inside the crown.

I claim:

1. A shoulder-mounted windowed safety hood formed in large part of soft material and including a head hood adapted to cover the human head, a downward extension therefrom having front and back portions connected by shoulder portions adapted to rest on the human shoulders, a transversely extending relatively rigid transverse brace secured across the back portion near the shoulder portions, an upwardly extending relatively rigid brace secured along the back portion to be supported by the shoulders through the transverse brace, extending below the transverse brace to be positioned by the back of the wearer and crossing the transverse brace and extending substantially to the top of the head hood to support the head hood independently of the head therein, said head hood including a transparent portion in the front.

2. A hood according to claim 1 in which the head hood is substantially larger than the human head, so that the head may turn therein, the window extending at least as far rearwardly as half way from front to rear.

3. A hood according to claim 1 in which the braces are concealed by strips of material secured to the sheath along most of their lengths, including points along the transverse brace in proximity to the point where the braces cross, the braces being free of one another but bound into cooperative relation by the securing thereof to the sheath.

4. A safety hood according to claim 1 in which the upwardly extending brace is a tube having its discharge opening near the top of the hood, a pocket enclosing the discharge opening and having a wide opening within the hood, to liberate softly the air supplied through the tube.

5. A safety hood according to claim 1 in which the upwardly extending brace is a tube having its discharge opening near the top of the hood.

6. A safety hood according to claim 1 having relatively rigid braces extending transversely over the shoulder portions and over the ends of the transverse brace.

7. A safety hood including a flexible body having a window opening therein, a flexible transparent sheet in the opening, and means for sealing the body to the sheet and holding the sheet for ready replacement including a pair of flaps extending from the body inside and outside of the sheet all along its edge, and substantially continuous flexible magnet strips carried by and secured to the respective flaps to be opposite to one another all along the periphery of the sheet with the sheet between them, the strips being oppositely magnetized transversely to attract one another throughout their length, and the bottom of the opening extending lower at its midportion than at its ends.

8. A safety hood including a flexible body having a window opening therein, a flexible transparent sheet in the opening, and means for sealing the body to the sheet and holding the sheet for ready replacement including a pair of flaps extending from the body inside and outside of the sheet all along its edge, and substantially continuous flexible magnet strips carried by and secured to the respective flaps to be opposite to one another all along the periphery of the sheet with the sheet between them, the strips being oppositely magnetized transversely to attract one another throughout their length.

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9. A safety hood including a flexible body having a window opening therein, a flexible transparent sheet in the opening, and means for sealing the body to the sheet and holding the sheet for ready replacement including a pair of flaps extending from the body inside and outside of the sheet all along its edge, and substantially continuous flexible magnet strips carried by and secured to the respective flaps to be opposite to one another all along the periphery of the sheet with the sheet between them, the strips being oppositely magnetized transversely to attract one another throughout their length, and securing means for holding the sheet in place independently of the magnet strips.

10. A safety hood including a flexible body having a window opening therein, a flexible transparent sheet in the opening, and means for sealing the body to the sheet and holding the sheet for ready replacement including a pair of flaps extending from the body inside and outside of the sheet all along its edge, and substantially continuous flexible magnet strips carried by and secured to the respective flaps to be opposite to one another all along the periphery of the sheet with the sheet between them, the strips being oppositely magnetized transversely to attract one another throughout their length, and securing means for holding the sheet in place independently of the magnet strips; said sheet being flexed rearwardly at the sides and said securing means including means securing the body to the sheet at the front at the top and bottom of the sheet.

11. A safety hood including a flexible body having a window opening therein extending across the front and rearwardly on both sides and extending lower at the front than at the sides, a flexible transparent sheet in the opening flexed rearwardly on both sides, releasable securing means for holding the sheet in the opening including means releasably securing the body to the sheet at the front at the top and bottom of the sheet, means for sealing the body to the sheet including a pair of flaps extending from the body inside and outside of the sheet at least all along its bottom edge, and flexible magnet strips carried by and secured to the respective flaps to be opposite to one another with the sheet between them, the strips being oppositely magnetized transversely to attract one another throughout their length.

12. A windowed safety hood adapted to cover the human head and shoulders, including a sheath having front and back portions connected by shoulder portions adapted to rest on the human shoulders, the back portion extending upwardly behind and over the top of the head to form the body of the head hood, relatively rigid brace means for supporting the head hood from the shoulders independently of the head therein, said head hood being substantially larger than the human head to permit the head to be turned therein, transparent means forming a window in the hood across the front thereof and rearwardly on both sides to at least the front of the shoulders extending to a lower position in front than over the shoulders, and means along the bottom edge of the window sealed to the sheath and frictionally engaging the transparent means, including flexible magnet strips on opposite sides of the transparent means, opposing one another to attract one another through the transparent means.

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