Jan. 21, 1969 C. E. BOWERS, JR 3,422,459

PROTECTIVE HEAD COVERING

Filed Dec. 9, 1966 Sheet 1 of 2

Fig. 1.

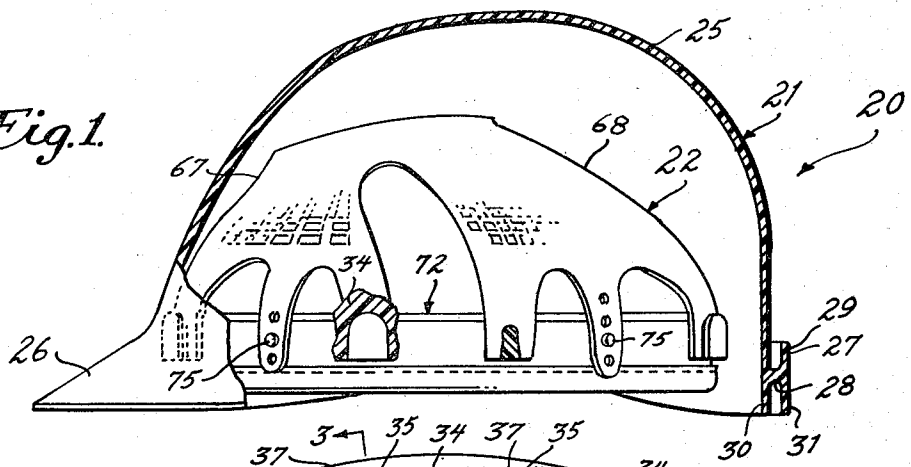


Fig. 2.

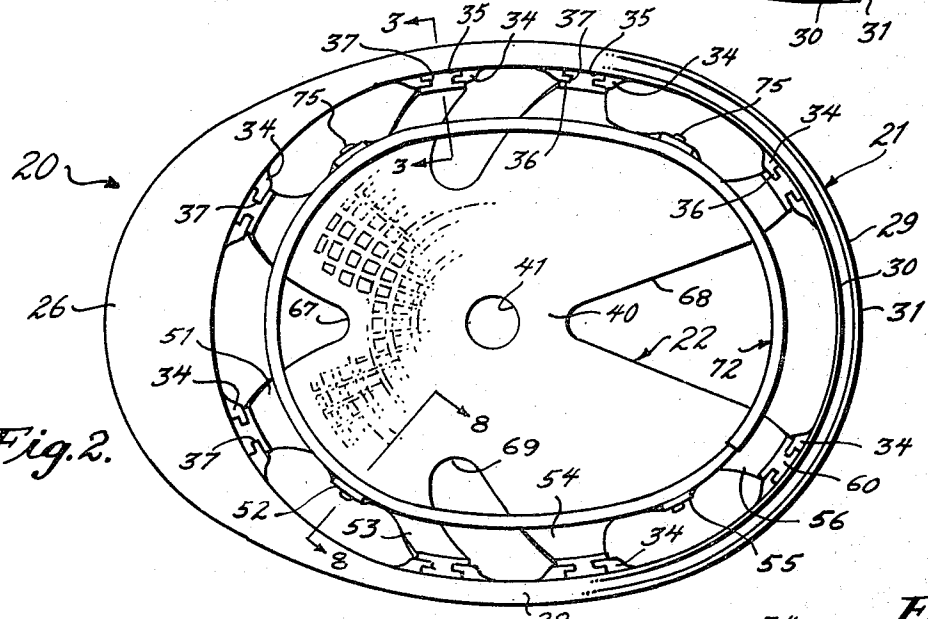


Fig. 3.

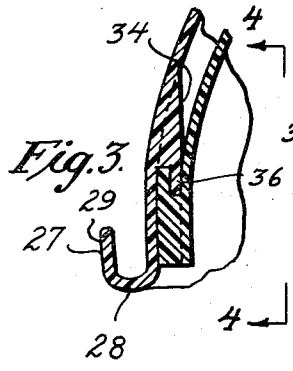


Fig. 4.

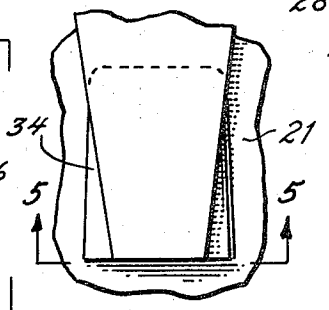


Fig. 5.

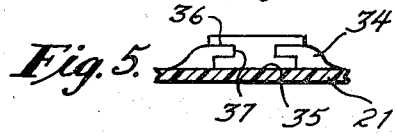


Fig. 6.

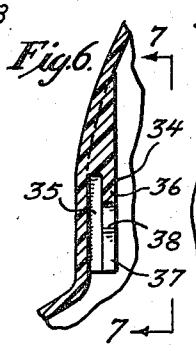
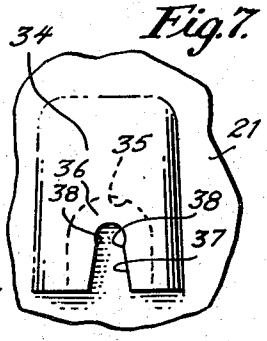


Fig. 7.



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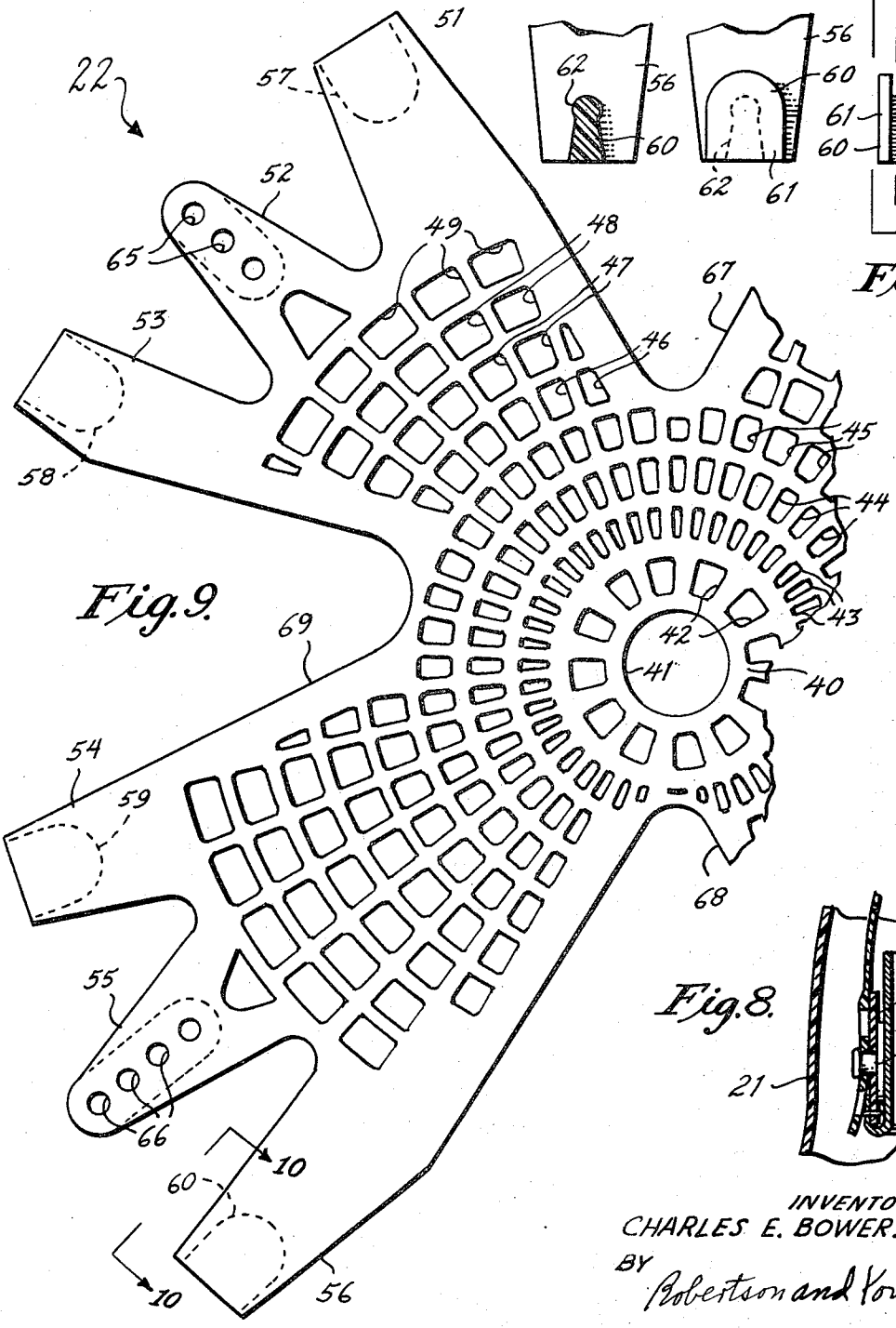


Fig. 9.

Fig. 12. Fig. 11.

Fig. 10.

Fig. 8.

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PROTECTIVE HEAD COVERING

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U.S. Cl. 2—3 2 Claims
Int. Cl. A42b 3/00; A42c 5/04

ABSTRACT OF THE DISCLOSURE

The device disclosed in this application consists essentially of a relatively hard outer shell for spacedly covering a wearer's head, and a flexible yieldable inner liner for seating on the wearer's head and suspending the shell in its spaced relation, wherein the liner is provided over substantially its entire area with a multitude of thru apertures for increased yieldability of the liner and enhanced ventilation to the wearer's head.

This invention relates generally to protective head coverings.

As is well known to those versed in the art, protective head coverings may conventionally employ a hard outer shell and a flexible, yieldable inner liner seated on the wearer's head and suspending the outer shell in spaced relation with respect to the wearer's head. Protection from hazards of flying objects and the like requires that the liner be yieldable under impact against the shell for absorbing or cushioning the impact, while comfort to the wearer demands that the head covering afford adequate free flow of air and ventilation. In practice, liners of protective head coverings have heretofore been formed of yieldably distensible sheet material, such as plastic, for absorbing the shock of impact; and further, such liners have substantially completely covered the wearer's head to distribute the force of impact with minimum unit pressure. The requisite liner area provided to minimize unit pressure has resulted in decreased liner yieldability and discomfort to the wearer by failure of ventilation to the wearer's head.

Accordingly, it is an important object of the present invention to provide a unique protective-head-covering construction wherein substantial area of liner adequately minimizes unit pressure under impact, while yieldability is increased and comfort is enhanced by more effective ventilation.

It is a further object of the present invention to provide a protective-head-covering structure wherein the shell is more effectively reinforced and rigidified about its peripheral edge, while being provided with effective drainage as of rain water, and the like.

It is still another object of the present invention to provide a protective-head-covering structure having the advantageous characteristics mentioned in the preceding paragraphs, wherein a highly improved detachable connection is afforded between the liner and shell.

It is still a further object of the present invention to provide a protective head covering of the type described which is extremely simple in construction, durable and reliable throughout a long useful life, and which can be economically mass-produced for sale at a reasonable price.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction

hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

FIGURE 1 is a side elevational view, partly broken away, illustrating a protective head covering constructed in accordance with the teachings of the present invention;

FIGURE 2 is a bottom plan view of the device of FIGURE 1;

FIGURE 3 is a partial sectional elevational view taken generally along the line 3—3 of FIGURE 2;

FIGURE 4 is a fragmentary elevational view taken generally along the line 4—4 of FIGURE 3;

FIGURE 5 is a fragmentary sectional view taken generally along the line 5—5 of FIGURE 4;

FIGURE 6 is a sectional elevational view similar to FIGURE 3, but showing the shell with the liner removed;

FIGURE 7 is a fragmentary elevational view taken generally along the line 7—7 of FIGURE 6;

FIGURE 8 is a partial sectional elevational view taken generally along the line 8—8 of FIGURE 2;

FIGURE 9 is a partial plan view showing the liner removed from the shell;

FIGURE 10 is a partial elevational view taken generally along the line 10—10 of FIGURE 9;

FIGURE 11 is a partial elevational view taken generally along the line 11—11 of FIGURE 10; and

FIGURE 12 is a partial sectional elevational view taken generally along the line 12—12 of FIGURE 10.

Referring now more particularly to the drawings, and specifically to FIGURES 1 and 2 thereof, a protective head covering is there generally designated **20**, and includes a relatively stiff or hard outer shell **21**, and a relatively flexible inner liner **22** in spaced conforming relation within the shell.

More particularly, the shell **21** may be formed in any suitable manner, say molded of plastic, including a concave, downwardly opening dome **25**, which may be formed at its lower forward edge with a cap peak **26**, if desired. Along the lower rear and side edges of the shell **21** there may extend a trough **27**, facing upwardly and opening at its forward ends on opposite sides of the shell. The trough **27** may be defined by an outstanding ledge **28** extending along the lower rear and side edges of the shell, and an upstanding wall **29** along the ledge, spaced outward from the shell. In addition to the rigidifying function of the trough **27**, it serves to receive and drain rain water, and the like, in a manner most comfortable to the wearer.

In addition the shell **21** is provided along its lower rear edge, and the adjacent portions of its side edges with a pair of generally parallel, spaced, depending reinforcement members or ribs **30** and **31**. The reinforcement member or rib **30** is innermost, and may constitute a depending extension of the shell **25**, while the outer reinforcement member or rib **31** may constitute a depending extension of the trough wall **29**. By the reinforcement members **30** and **31**, additional rigidity and strength is afforded the lower rear and side edge portions of the shell.

Interiorly of the downwardly facing, concave shell **25**, at spaced locations about, and adjacent to the lower shell edge, there are provided a plurality of sockets **34**. The sockets **34** may advantageously be formed integral with the shell, as smooth enlargements on the internal surface thereof, each having an internal cavity **35** opening downwardly from the respective socket, being bounded on its outer side by the adjacent wall portion of shell **21**, and on its inner side by an inner wall **36** of the respective socket **34**. The cavity **35** of each socket **34** opens downwardly from the socket; and further, each socket inner wall **36** is formed with a generally vertically extending thru slot **37**, also opening downwardly. That is, the slot

37 of each socket 34 opens through its respective inner socket wall 36, affording lateral communication between the cavity 35 of the respective socket 34 and the interior of the shell 21. As best seen in FIGURES 6 and 7, each socekt slot 37 is provided intermediate its upper and lower ends with a reduced region, as defined between a pair of detents or projections 38, for a purpose appearing presently.

The liner 22 is advantageously fabricated of yieldable flexible material, and may be integrally molded of plastic, or otherwise formed of suitable material. The liner 22 may be symmetrical about its longitudinal centerline, and substantially flat in an unflexed condition, so that the partial plan view of FIGURE 9 is complete in detail. It will there be seen that the liner 22 includes a central portion 40, which may have a relatively large central opening 41. Formed in the central liner portion 40 may be a series of radially spaced, annular arrays of thru apertures, say the arrays of apertures 42, 43, 44, 45, 46, 47, 48 and 49. It will be observed that the multiple apertures cover substantially the entire area of the liner 22, so that the liner is substantially reticulate or of openwork configuration.

At circumferentially spaced locations about the liner 22 there are provided a plurality of liner extensions 51, 52, 53, 54, 55 and 56. These extensions may be formed integral with the liner, if desired. Certain of the extensions, say extensions 51, 53, 54 and 56 may be provided on one side with bosses, as at 57, 58, 59 and 60. The boss 60 is best seen in FIGURES 10–12 as including a projection on one face of liner extension 60, and an enlargement or head 61 on the projection spaced from the liner extension. As best seen in FIGURES 11 and 12, the boss 60 may be of an elongate configuration, essentially similar to that of slot 37, having a reduced medial portion 62, similar to the slot portion between detents 38. Further, the head 61 of boss 60 is configured for conforming engagement in a cavity 35 of socket 34. The several bosses 57, 58 and 59 may be substantially identical to the boss 60.

The remaining liner extensions 52 and 55 may each be provided with a series of spaced apertures, as at 65 and 66, each such series being arranged radially of the liner 22.

In addition, the liner 22 may be formed with a plurality of radially inwardly extending cutouts to facilitate flexure of the liner to its concave configuration of FIGURES 1 and 2. For example, a cutout 67 may extend radially inwardly from the forward end of liner 22, while a cutout 68 may extend radially inwardly from the rearward end of the liner, both the forward and rearward cutouts terminating short of the central aperture 41. Similarly, a pair of side cutouts 69 may extend radially inwardly from opposite sides of the liner, also terminating short of the central liner aperture.

By reason of the radial cutouts 67, 68 and 69, as well as the liner apertures 41–49, the liner may be readily flexed to assume a concave configuration and disposed in generally conformably spaced relation within the shell 21. In this condition, the several extensions 51, 53, 54 and 56 are arranged adjacent to respective sockets 34 of the shell, and the bosses 57, 58, 59 and 60 are engaged upward into the socket slots 37, extending therethrough, with the boss heads conformably received in the respective adjacent socket cavities 35. This condition is best seen in FIGURES 2 and 3. Also, it will be apparent that the configuration of the bosses 57, 58, 59 and 60, as represented in FIGURES 10–12, is such as to snap-engage into the respective receiving slots 37, as by snap engagement of the slot detents 38 into the reduced boss region 62. This prevents inadvertent removal of bosses from the receiving slots, while permitting deliberate removal therefrom. Thus, the bosses 57–60 serve as means for connecting the liner 22 to the shell 21 in a detachable manner.

Extending circumferentially about the lower region of the concavely configured liner 22, interiorly thereof, is a

headband 72. The headband may include a flexible strip 73 bent upon itself with its ends in overlapping engagement, and carrying along one edge a relatively soft head-engaging member 74 folded to lie along the interior of the strip 73. The strip 73 is connected to the several liner extensions 52 and 55, as by a headed button or shank 75. That is, a headed button or shank 75 extends through the strip 73 and is selectively passed through one of the apertures 65, 66 to detachably connect the headband to the liner 22. As will be apparent, the headband is vertically adjustable relative to the liner by insertion of the button 75 through a selected upper or lower extension hole 65, 66. If desired, the headband strip 73 may be circumferentially adjustable to accommodate different head sizes, in the conventional manner.

It will now be understood that the liner 22 provides a suspension structure for the shell 21, with the liner seating on a wearer's head serving to suspend the shell in spaced relation over the wearer's head. By reason of the multitude of apertures or perforations through the liner 22, the liner is afforded a flexibility for smooth conforming engagement with the wearer's head, as well as a yieldability for absorbing impact or shock, and enhanced ventilating characteristics for comfort. As the multitude of apertures 41–49 are located substantially completely over the entire area of the liner 22, it will be appreciated that there is an effectively even distribution of unit pressure against the wearer's head in the event of impact.

From the foregoing, it is seen that the present invention provides a protective head covering which fully accomplishes its intended objects and is well adapted to meet practical conditions of manufacture and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A protective head covering comprising a relatively stiff concave shell for arrangement in spaced relation over a wearer's head; and a suspension structure interiorly of said shell and adapted to seat on a wearer's head; said suspension structure comprising a liner of flexible yieldable sheet material having a concave configuration and in conformably spaced relation within said shell, a headband extending about the periphery of said liner, a plurality of liner extensions depending about the periphery of said liner, shell-connection means connecting certain of said extensions to said shell, and headband-connection means connecting the remainder of said extensions to said headband, said liner being normally flat in its unflexed condition and formed thereover with a multitude of thru apertures affording ventilation to the wearer and a yieldable flexibility for assuming its concave configuration conformably engaging a wearer's head, an upwardly facing trough extending along the rear and side edges of said shell for drainage and increased shell rigidity, said trough having an inner wall defined by an extension of said shell and an outer wall spaced from said inner wall, and a pair of spaced reinforcing ribs depending along the rear edge of said shell respectively beneath the inner and outer walls of said trough.

2. A protective head covering according to claim 1, said apertures being located in a plurality of generally concentric annular arrays over substantially the entire area of said liner exclusive of said liner extensions for effective ventilation and flexure to a generally spherical concave configuration, and said shell-connection means comprising a plurality of circumferentially spaced downwardly opening sockets on said shell, said sockets each having its inner wall formed with a generally vertical thru slot opening at its lower end for communication through said slot between the interior of the respective

socket in the interior of said shell, and a headed boss carried by each of said certain liner extensions for engagement through respective slots into the adjacent socket, said slots each being formed with an intermediate portion of reduced dimension for snap engagement therethrough of the respective boss.

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