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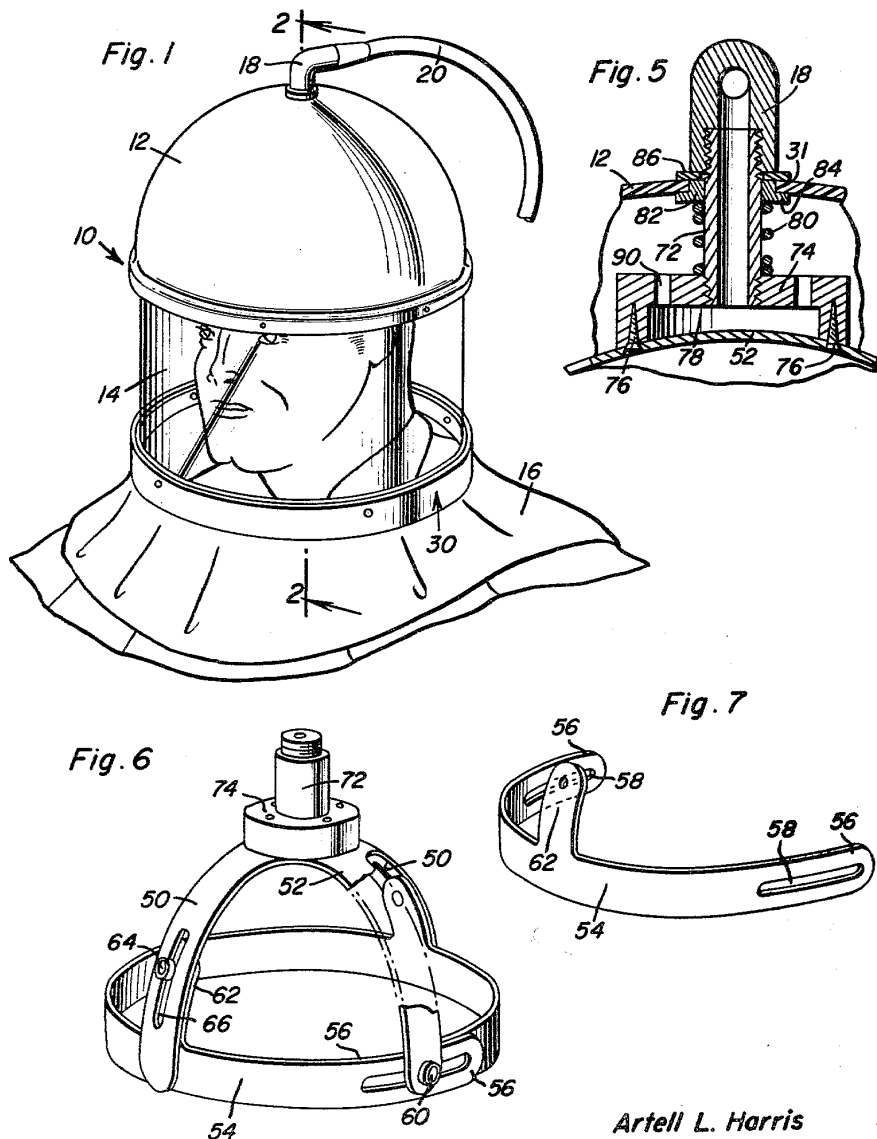
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SAND BLASTER'S HELMET

Filed April 22, 1963

2 Sheets-Sheet 1



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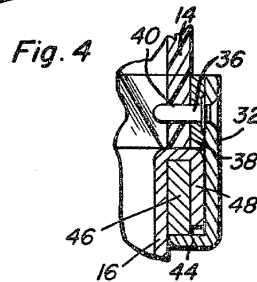
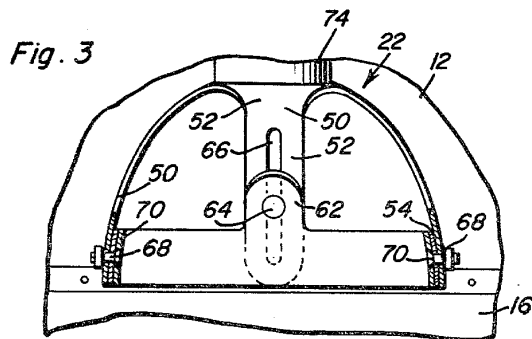
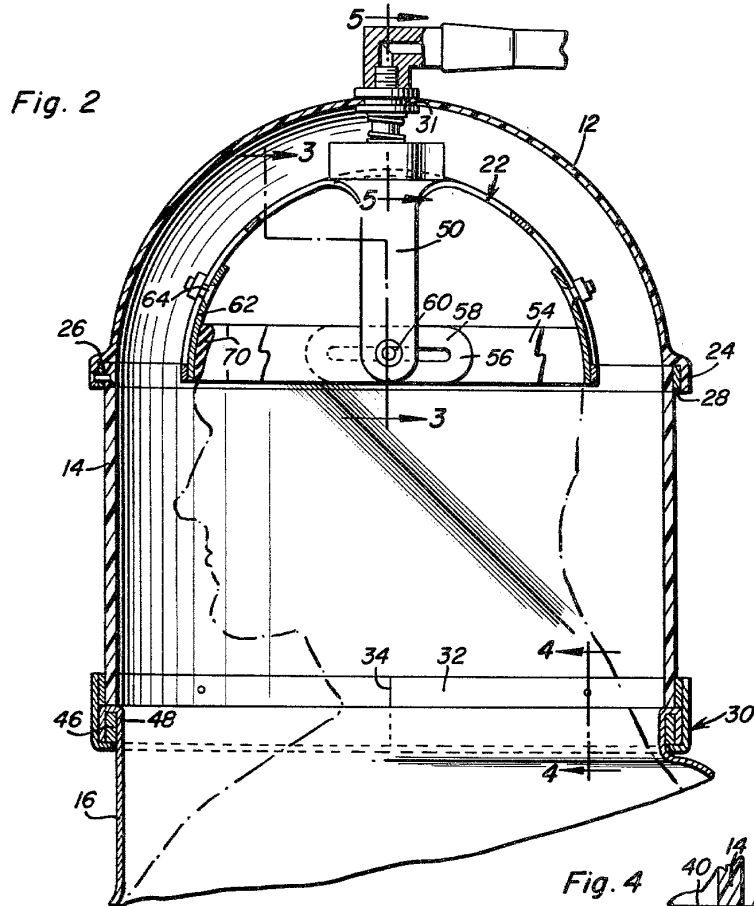
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SAND BLASTER'S HELMET

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2 Sheets-Sheet 2



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SAND BLASTER'S HELMET**Artell L. Harris, 244 E. 2nd N., Rexburg, Idaho**
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13 Claims. (Cl. 128—142)

This invention comprises a novel and useful sand blaster's helmet and more particularly pertains to a helmet affording the maximum visibility for workers while protecting them from injurious conditions such as harmful sand spray, noxious fumes and other detrimental conditions.

It is the primary object of this invention to provide a protective helmet especially adapted to furnish adequate protection for the eyes and head of a person without impairing the range or clarity of vision of the wearer.

A further object of the invention is to provide a helmet having a transparent, generally cylindrical shield extending entirely about the head and affording a complete 360° range of visibility therethrough.

A further object of the invention is to provide a protective helmet in accordance with the foregoing objects wherein the helmet may be rotationally adjusted about the head of the wearer to present fresh clear areas of vision when after continued use in one position, the visibility of the shield has deteriorated, thereby greatly lengthening the useful life of the helmet.

A further purpose of the invention is to provide a helmet wherein the head of the wearer is surrounded and protected by a constant stream of air supplied to the interior of the helmet thereby affording a satisfactory supply of air for the user when the helmet is employed in noxious atmospheres or wherein the surrounding air has harmful substances therein.

A further object of the invention is to provide a helmet having an improved means for supporting a relatively rigid outer casing or shell upon the head of the wearer but in a spaced relation relative thereto and which shell shall be capable of ready adjustment to present successive sections of the transparent shield before the eyes of the wearer and wherein the device shall be readily adjustable and capable of easy assembly and disassembly facilitating inspection or servicing thereof.

Still another object of the invention is to provide a helmet in accordance with the foregoing objects having a shoulder apron or curtain of a pliable material easily attachable or removable from the helmet and which apron may have its lower end disposed upon the shoulders of the wearer or within the neck portion of clothing in order to prevent the ingress of undesirable gases or foreign matter into the interior of the helmet.

A further object of the invention is to provide a protective helmet in accordance with the foregoing objects wherein a constant stream of air may be supplied to the interior of the helmet about the head of the wearer for various purposes together with an air distributing means built into the support means for the helmet for more effectively distributing and circulating the incoming air throughout the helmet and about the wearer's head.

And a final important object of the invention to be specifically enumerated herein resides in the provision of a helmet having an outer casing or shell with a transparent shield fixedly mounted thereon and wherein the outer casing and shield may be readily rotatable upon a support means by which the helmet is mounted upon the head of the wearer.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accom-

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panying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of a preferred embodiment of the device and showing the latter in operative position upon the head of a wearer;

FIGURE 2 is an enlarged view in vertical transverse section taken substantially upon the plane indicated by the section line 2—2 of FIGURE 1, the position of the head of the wearer being shown in phantom therein in dot-and-dash lines;

FIGURES 3 is a detail view in vertical section taken substantially upon the plane indicated by the broken section line 3—3 of FIGURE 2 and showing certain details of the helmet support means;

FIGURE 4 is a further detail view in vertical section taken substantially upon the plane indicated by the section line 4—4 of FIGURE 2 and showing the fastening means for securing the shoulder apron or curtain to the transparent shield of the helmet;

FIGURE 5 is another detail view in vertical section taken substantially upon the plane indicated by the section line 5—5 of FIGURE 2 and showing the air distributing means and the pivotal connection of the helmet outer casing or shell upon the support means of the helmet;

FIGURE 6 is a perspective view, certain parts being broken away and shown in broken lines and of the support means structure with the air distributing means thereon; and

FIGURE 7 is a perspective view of a radially and circumferentially resilient spring ring forming a part of the fastening means of the helmet.

Referring first to FIGURE 1 which illustrates the helmet in use, it will be observed that the device indicated generally by the numeral 10 in its most complete and comprehensive form consists of a dome-shaped, hemispherical downwardly opening body 12 forming an outer shell and consisting of a substantially rigid material such as Fiberglas, a suitable plastic or the like. Carried by and depending from the lower edge or rim of the shell 12 is a transparent cylindrical shield 14. Further, depending from the lower end of the transparent shield 14 is a shoulder apron or curtain 16 adapted to rest upon the shoulders of or to be received within the neck portion of the clothing of the wearer. Finally, at the top of the dome there is provided a fitting 18 extending into the shell and which enables air from any suitable source of supply, not shown, to be delivered by a conduit or flexible hose 20 to the interior of the helmet.

Referring next to FIGURES 2, 3, 6 and 7 it will be observed that there is provided a spider shaped structure comprising a support indicated generally by the numeral 22 and which is adapted to be mounted upon the head of the wearer and serves to support the helmet therefrom and in spaced relation about the wearer's head. In accordance with this invention the entire helmet assembly consisting of the shell 12, the transparent shield 14 and the apron 16 are mounted upon the top of the support 22 in a manner to permit rotational adjustment of the helmet about a vertical axis with the helmet being held in spaced relation to the head of the wearer for purposes to be subsequently set forth.

Referring first to the shell 12, it will be observed that the lower end of the latter is provided with a diametrically enlarged laterally outwardly offset cylindrical flange forming a lower rim 24. Fixedly and removably secured in this lower rim in a detachable manner by means of fasteners 26 of any suitable character and through the agency of a ring of felt or other gasket material 28 is the upper edge of the transparent shield 14. At its upper and central portion the cap is provided with an opening 31 therethrough which provides a means



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whereby the cap and therefore the helmet may be detachably and rotatably mounted upon an upstanding element attached to the support 22.

Preferably the shield 14 consists of a generally rectangular sheet of a pliable flexible transparent material of any suitable character. The sheet-like nature of this material permits its more compact storage and transportation than would be the case if the shield were to consist of a rigid cylindrical member. When the device is assembled, the sheet forming the shield 14 is rolled into a cylinder with its ends either abutting or overlapping. The upper edge of the shield is then secured in the rim 24 of the cap by releasing the shield which then expands until the shield holes are aligned with a series of inwardly projecting pins 26 fixedly secured in the rim 24 and extending inwardly and through a felt strip or other gasket 28. The length of the plastic shield is predetermined so that when rolled into a radially compressed cylinder and then positioned into the rim 24 and firmly pressed into the felt gasket 28 and then released, it will expand with its ends abutting or overlapping to form a near perfect seal. To facilitate this action, the holes in the shield receiving the pins 26 will be elongated. The retainer 30 consists of a flat flexible and resilient spring steel strip 32 having ends 34. A series of inwardly projecting pins 36 constitute fasteners which are fixedly secured to and project inwardly of the flexible ring 32 and, extending through a felt strip or other gasket 38, are engaged in complementary bores or apertures 40 disposed in the lower portion of the shield 14. The retaining ring or strip is radially and circumferentially resilient and contractile, so that in use the strip is stretched outwardly to enable it to embrace the lower end of the shield, whereupon the resiliency of the strip will cause the pins to be retained in the apertures 40 in the shield and thus confine the lower end of the shield.

As shown best in FIGURE 4, the flexible band has a lower returned flange 44 which may be in the form of an annular rib extending entirely the length of the strip or may consist merely of a series of circumferentially spaced lugs thereon. In any event, the resilient, inwardly biased retaining ring embraces therein and supports by the flange 44 a rigid ring 46 of metal or other suitable material. The upper edge of the apron 16 enfolds the rigid ring 46 as shown at 48 and is clamped to the rigid ring by engagement of the retaining ring as will be clearly apparent from a consideration of FIGURES 2 and 4. Thus, the apron is releasably secured to the lower end of the transparent shield 14 by the retaining means which also serves the function of retaining the sheet material of the shield in a cylindrical configuration.

Referring now more specifically to FIGURES 2, 3, 6 and 7, it will be understood that the support 22 comprises a four legged spider having four arcuately and downwardly extending flexible legs 50 which at their upper ends converge into a central rib or plate 52. A flexible band 54 having overlapping ends as at 56 is secured to the lower ends of the legs and supported thereby. As shown in FIGURE 7, the overlapping ends of the flexible band 54 are provided with arcuately extending slots 58 and a fastener in the form of a bolt or the like as at 60 carried by one of the support spider legs 50 extends through the slots of the overlapping ends to thereby circumferentially adjust and retain the band 54 in circumferentially adjusted position to fit the head of the wearer. In order to further secure the flexible band 54 to the spider structure, the band is provided with an upstanding bracket as at 62 which is secured as by means of a fastener 64 to a leg 50 having a vertically elongated adjusting slot 66 therein.

Fasteners 68, see FIGURE 3, secure the other two legs 50 of the spider to diametrically opposite sides of the flexible band 54. Conveniently, a sweatband or the like as at 70 may be secured inside the band 54 by the

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fasteners 68 and 60 in order to contribute to the comfort of the support upon the head of the wearer.

Referring now to FIGURE 5 it will be observed that a mounting means is provided upon the top of the spider support which performs a number of different functions. This mounting means consists of a hollow spindle 72 which is externally threaded at its upper and lower ends. Engaged upon the lower threaded end of the spindle is a cup-shaped downwardly opening body comprising an air distributor 74. This body is secured to the top surface of the central web 52 of the spider support 22 as by means of fastening screws 76. There is thus provided a chamber 78 within the cup-shaped air distributor and the top of the web 52 as shown in FIGURE 5.

A compression spring 80 encircles the spindle and at its lower end abuts upon the top surface of the air distributor 74 and supports a two-piece nylon grommet or bushing which is received in the aperture 31 of the shell 12. This bushing includes a lower portion 82 comprising a central body with a laterally projecting flange 84 which rests upon the underside of the shell 12, and a flat nylon washer 86 which rests upon the top surface of the shell. The spring thus resiliently supports the shell and the attached shield and apron in vertically spaced relation to the head of the wearer, thus providing an air space about the wearer's head as shown in FIGURE 2.

An L-shaped fitting 18 previously mentioned is threaded upon the upper end of the spindle and retains the shell thereon, limiting the upward spacing of the shell from the support.

It will be noted that air supplied from any suitable source by the conduit 20 through the fitting 18 passes downwardly through the hollow spindle 72 and into the chamber 78 within the air distributor 74. Distributing openings 90 are provided in the top wall of the air distributor 74 which causes this air to be directed upwardly against the underside of the shell and then pass outwardly and downwardly adjacent the curving inside walls of the shell about the face of the wearer to be subsequently discharged from the lower end of the shield if the apron is not worn, or from underneath the apron if the latter is in use.

From the foregoing, it will be apparent that there has been provided a protective helmet possessing a number of important structural and functional advantages. Thus, the device is readily assembled or disassembled for compact storage, repairs or servicing as may be necessary. The device may be employed either with the transparent shield 14 open at its lower end by omitting therefrom the apron 16, or may be used in its entirety with the apron attached and with the apron either upon the shoulder of the wearer as shown in FIGURE 1 or disposed within the neck portion of the wearer's clothing when a more secure sealing of the device from the outside atmosphere is desired. With the apron in place, and the continuous supply of air through the conduit 20 to the interior of the helmet, the wearer is protected from such hazards as the presence of noxious vapors in the atmosphere, or the ingress of foreign matter such as sand particles when used as a sand blaster's helmet, and the like, where protection is desired merely against particles in the atmosphere in the vicinity of the eyes of the wearer, the transparent shield 14 extending downwardly below the head of the wearer affords adequate protection for the eyes while insuring complete visibility.

In certain uses of a helmet, such as by sand blasters, the ricocheting sand particles will frequently strike the helmet and particularly the transparent shield directly in front of the eyes. Consequently, a certain area of the shield will thus be subjected to greater wear and eventually will become clouded or partially opaque. When this occurs, all that is necessary is to rotate the entire helmet about the spindle to present a new and unclouded portion of the transparent shield in front of the eyes of the user. This is easily effected since the shield is retained in posi-



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tion solely by the spring tension of the member 30, thereby obviating the necessity for removing the helmet in order to rotationally adjust the shield. Thus, the entire 360 degrees of the circumference of the transparent shield may be successively brought into use thus obtaining the full utility of the shield before it is necessary to replace it.

The spacing of the support from the shield affords a space or chamber therein through which circulating air can flow. This air will not only supply oxygen for the user in certain instances, but also will serve to cool the wearer's head and in some instances will by virtue of its superatmospheric pressure will preclude the entrance of noxious gases into the shield and helmet.

The fitting 18 serves not only to establish communication of the supply of air to the interior of the helmet but also serves as a means to retain releasably the helmet upon its support structure 22 and the spindle 72 thereof and also to enable rotational adjustment of the helmet.

The resilient ring 30 at the lower end of the shield serves the dual functions of securing the ends of the sheet material into a cylindrical configuration, reinforces and stiffens the lower end of the cylindrical shield, and further functions as a means to releasably retain and secure in a sealed manner to the shield the upper end of the apron 16.

The rigid ring 46 functions both as a means to retain the apron to the shield and also as a stiffener for the resilient ring.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A helmet comprising a support adapted for resting upon the head of a wearer in embracing engagement therewith, an outer shell of a substantially rigid material, said support and outer shell each having an upper end with a central portion, means rotatably supporting said outer shell upon said support at the upper ends and at the central portions of said support and outer shell for rotational adjustment about a generally vertical axis, said shell comprising a dome-shaped, hemispherical downwardly opening body, a transparent generally cylindrical shield, means securing said shield to and depending from the peripheral edge of said body and extending downwardly therefrom to substantially the shoulders of a wearer whereby to substantially completely surround the wearer's head.

2. The combination of claim 1 wherein said shield consists of a flexible pliable flat sheet of material, the sheet being folded into a cylinder, means securing the upper edge of said cylinder to the interior of the lower edge of said body, a retaining ring surrounding and confining the lower edge of said cylinder.

3. The combination of claim 2 including an apron of pliable material extending from said shield down to and upon the shoulders of the wearer, said apron having a cylindrical rim at its upper end, said retaining ring securing said apron cylindrical rim to said shield lower edge.

4. The combination of claim 1 wherein said shell is spaced from the wearer's head, means for circulating air through the space within said shell and about the wearer's head.

5. A helmet comprising a support adapted for resting upon the head of a wearer in embracing engagement therewith, an outer shell of a substantially rigid material mounted upon said support for rotational adjustment about a generally vertical axis, said shell comprising a dome-shaped hemispherical downwardly opening body, a transparent generally cylindrical shield secured to and depending from the peripheral edge of said body and ex-

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tending downwardly therefrom to substantially the shoulders of a wearer whereby to substantially completely surround the wearer's head, said shell being spaced from the wearer's head, means for circulating air through the space within said shell and about the wearer's head, an upstanding hollow spindle upon said support, an air distributor at the lower end of said spindle, said shell being rotatably mounted upon said spindle and above said air distributor, means for supplying air to said spindle.

6. The combination of claim 5 including a spring surrounding said spindle and abutting said shell and air distributor, said air supply means including a fitting on the upper end of said spindle retaining said shell thereon.

7. A helmet comprising a support adapted for resting upon the head of a wearer in embracing engagement therewith, an outer shell of a substantially rigid material mounted upon said support for rotational adjustment about a generally vertical axis, said shell comprising a dome-shaped, hemispherical downwardly opening body, a transparent generally cylindrical shield secured to and depending from the peripheral edge of said body and extending downwardly therefrom to substantially the shoulders of a wearer whereby to substantially completely surround the wearer's head, said shield consisting of a flexible pliable flat sheet of material, the sheet being folded into a cylinder, means securing the upper edge of said cylinder to the interior of the lower edge of said body, a retaining ring surrounding and confining the lower edge of said cylinder, said retaining ring comprising a flexible band having overlapping ends connectible together and fasteners engaging said shield.

8. The combination of claim 1 including a flexible band having its ends secured in adjustable overlapping relation, a bracket on said flexible band, said support being secured to said flexible band bracket.

9. The combination of claim 8 including a rigid ring, a further flexible band embracing said rigid ring and having a lateral retaining flange underlying said rigid ring for supporting the latter, an apron of pliable material depending from said shield to the shoulders of the wearer, said apron having an upper edge enveloping said rigid ring and clamped thereto by said further flexible band.

10. A helmet comprising a support adapted for embracingly resting upon the head of a wearer, a dome-shaped, substantially rigid, hemispherical and downwardly opening body enclosing and carried by said support, a transparent, generally cylindrical and open ended shield having its upper end secured to and sealingly engaged with and closing the lower edge of said body and extending downwardly therefrom to completely surround the wearer's head, means including cooperating relatively rotatable bearing surfaces on said body and support and mounting said body at its upper central portion upon said support in depending relation, said mounting means including fastening means retaining the bearing surfaces of said body upon that of said support in fixed but rotationally adjusted positions whereby the entire circumferential area of said shield may be selectively and successively positioned before the eyes of the wearer and afford clear unobstructed vision as the visibility of portions of said shield becomes impaired during use.

11. A helmet comprising a support adapted for embracingly resting upon the head of a wearer, a dome-shaped, downwardly opening body enclosing and carried by said support, a transparent, generally cylindrical, open-ended shield, having its upper end secured to and sealingly engaged with the lower edge of said body and extending downwardly therefrom to completely surround the wearer's head, an upstanding hollow spindle on said support, means supplying air to the upper end of said spindle, an air distributor on the lower end of said spindle and receiving air therefrom, said air distributor having outlet openings directing air upwardly therefrom to the top of said body from whence the air is directed downwardly and circulated about the head of the wearer.



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12. A helmet comprising a support adapted for embracingly resting upon the head of a wearer, a dome-shaped, downwardly opening body enclosing and carried by said support, a transparent, generally cylindrical, open-ended shield, having its upper end secured to and sealingly engaged with the lower edge of said body and extending downwardly therefrom to completely surround the wearer's head, an apron of pliable material extending from said shield down to and upon the shoulder of the wearer, said apron having a rim at its upper end, means retaining said apron upon said shield comprising a resilient ring, cooperating means on said resilient ring and the lower end of said shield releasably securing the former to the latter, means releasably fastening said apron rim to said resilient ring.

13. The combination of claim 12 wherein said resilient ring is a flexible band having overlapping ends, said re-

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leasable fastening means comprising a rigid ring recessed in and compressively embraced by said flexible band, said apron rim being received and clamped between said rigid ring and flexible band.

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JORDAN FRANKLIN, *Primary Examiner*.