April 21, 1959 F. J. FAHEY ET AL 2,882,894

HOOD

Filed Feb. 13, 1956

2 Sheets-Sheet 1

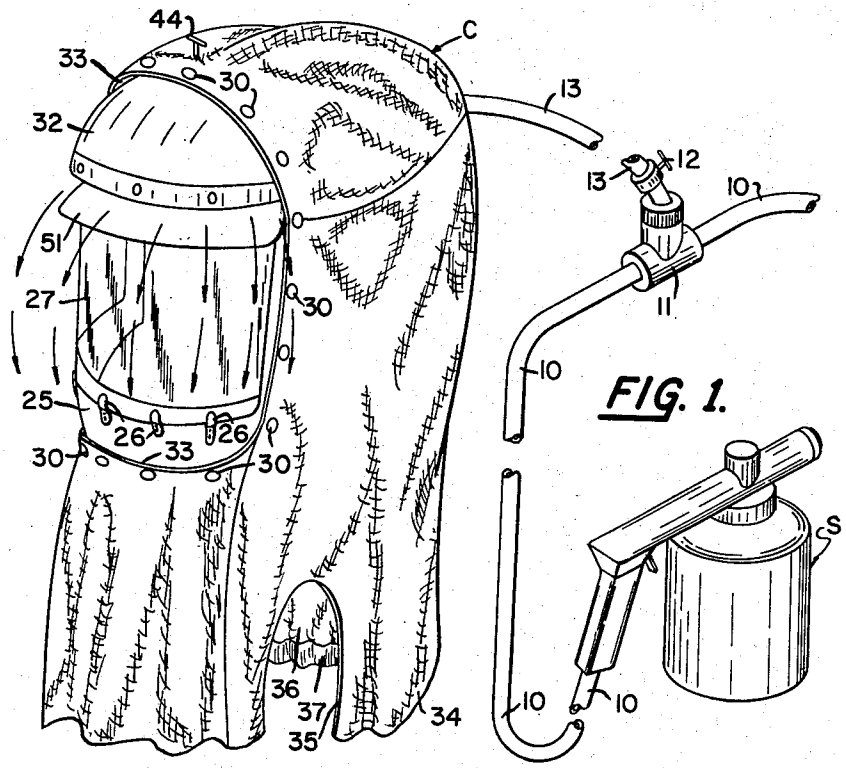

FIG. 1.

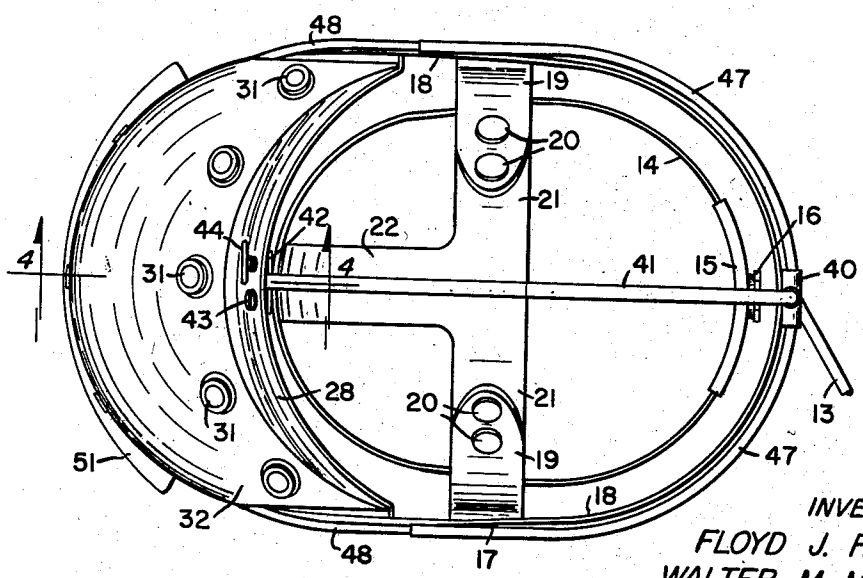

FIG. 2.

INVENTORS.
FLOYD J. FAHEY
WALTER M. McCRUM
BY
Horace B. Van Valkenburgh
ATTORNEY

April 21, 1959 F. J. FAHEY ET AL 2,882,894

HOOD

Filed Feb. 13, 1956

2 Sheets-Sheet 2

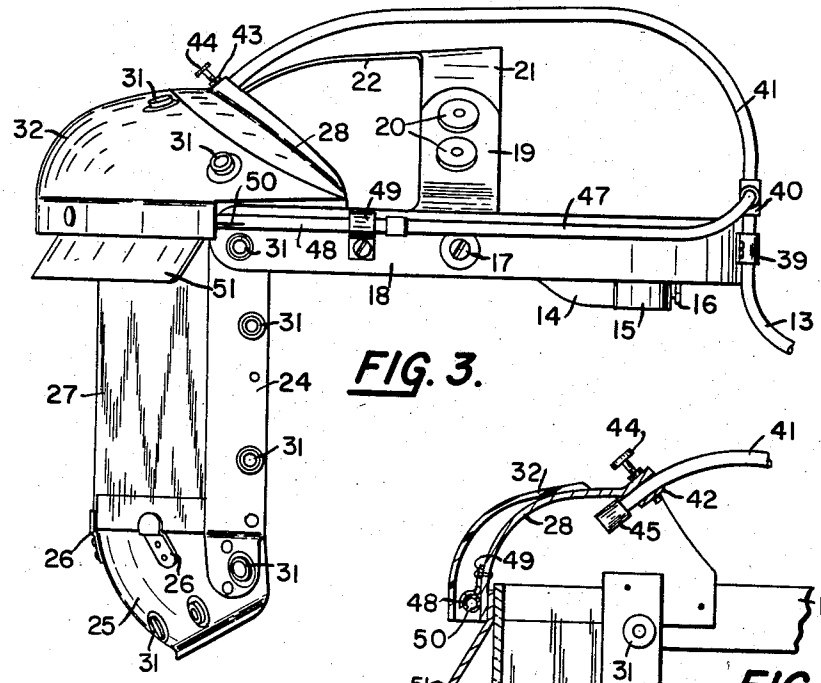

FIG. 3.

FIG. 4.

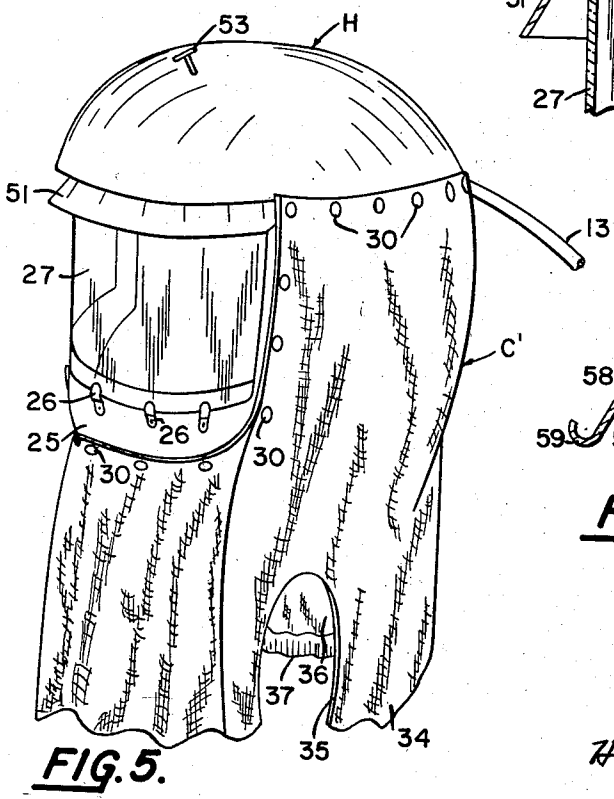

FIG. 5.

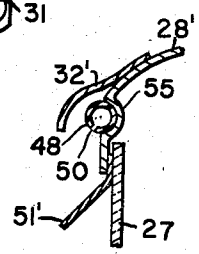

FIG. 6.

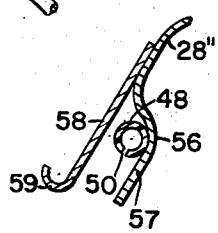

FIG. 7.

INVENTORS.
FLOYD J. FAHEY
WALTER M. McCRUM
BY
Horace B. Van Valkenburgh
ATTORNEY

United States Patent Office 2,882,894
Patented Apr. 21, 1959

2,882,894

HOOD

Floyd J. Fahey, Denver, and Walter M. McCrum, Aurora, Colo.

Application February 13, 1956, Serial No. 565,205

18 Claims. (Cl. 128—141)

This invention relates to hoods, and more particularly to hoods which enclose the head of the user to prevent paint or other objectionable sprays, mists, or the like, or noxious gases, fumes or the like from contacting the face or head of the user while permitting visibility by the user of the operation being performed.

Particularly when painting with a spray gun in enclosed spaces, such as ship bottoms, small rooms and the like, as well as in industrial plants and other situations where noxious gases, mists or fumes may be present, it is necessary to prevent the objectionable spray, gases, mists, fumes or the like from contacting the body of the operator, and particularly to prevent the same from being breathed by the operator. The operator may wear protective clothing to prevent an objectionable spray or mist or noxious fumes or gases from contacting the skin, but in order to perform the operation, such as painting as with a spray gun or an industrial operation such as taking readings or observations, adjusting valves, or other equipment, or similar operations, effective visibility by the operator must be secured. While to completely enclose the head of the operator would prevent contact of paint, gas, fumes or the like, but would impair visibility, it is desirable to position a transparent plate in front of the operator's face. However, in painting operations, such face plates tend quickly to be covered with paint, as due to contact by the fog of paint suspended in the atmosphere when painting with a spray gun or the like, or may become covered with other types of liquids, as in mist, droplet or similar form, as in industrial operations. Furthermore, to prevent the operator from breathing paint or noxious fumes, gases or mists, it is necessary to provide an air supply for breathing purposes which does not inconvenience the operator and therefore hinder or render his work more difficult.

Among the objects of the present invention are to provide a novel hood which is particularly useful in painting and other operations; to provide such a hood which will protect the operator from objectionable sprays or mist, paint, noxious gases, fumes and the like, and at the same time will provide adequate visibility; to provide such a hood in which air is supplied to the operator for breathing purposes and is readily adjusted by the operator; to provide such a hood in which a protective curtain of air is produced which effectively prevents a transparent face plate from becoming fogged or occluded whether the operator's head is in a normal upright position, with the operator either standing or sitting, or the operator is looking upwardly or downwardly or his head is in a radial position, as when the operator must lie in a reclining position in order to perform the desired operation; to provide such a hood which may be worn with a minimum degree of discomfort; to provide a novel device for producing a protective curtain of air for a transparent face plate of a protective hood; to provide such a hood in which the

tendency for paint or other liquid, as in droplets to drip off the top of the hood and onto a transparent face plate is minimized; to provide such a hood which may be manufactured readily; and to provide such a hood which can be put on and taken off the head with ease and rapidity and which can be readily adjusted to fit different operators.

Additional objects of this invention and the novel features thereof will become apparent from the description which follows, taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a hood constructed in accordance with this invention, showing also a hose line and spray painting equipment whch may be used by the operator;

Fig. 2 is a top plan view of the hood of Fig. 1, with a head cover of fabric or the like removed in order to show the interior construction more clearly;

Fig. 3 is a side elevation of the hood of Fig. 1, with the cover again removed;

Fig. 4 is a vertical section, taken along line 4—4 of Fig. 2;

Fig. 5 is a perspective view of an alternative form of this invention in which a protective helmet is incorporated therein;

Fig. 6 is a fragmentary vertical section, similar to a portion of Fig. 4, but illustrating an alternative form of certain parts thereof; and

Fig. 7 is a vertical section, similar to Fig. 6, illustrating a further alternative form of such parts.

In a hood constructed in accordance with this invention, as illustrated in Figs. 1 and 2, an air hose **10**, such as leading to a spray gun S, may be provided with a suitable connection, such as a T **11** connected to a valve **12**, to provide a regulated supply of air through a hose **13** to the hood. The hood may be supported on the head of the operator in any suitable manner, as by an adjustable framework which may include an oval head strap **14** adapted to encircle the head of the operator at the position of the forehead and provided at the rear with a conventional adjustment mechanism **15** having an adjusting knob **16**. The lateral strap **14** may be connected at each side, as by pivot pins **17** shown also in Fig. 3 and preferably adjustable, with a U-shaped support **18** which is open at the front and extends rearwardly in spaced position around the head strap **14** and is provided with a side strap **19** at each side which may be adjustably connected, as by snaps **20**, with the oppositely disposed ends **21** of a top, T-strap **22**, which is connected to the front of head strap **14**. As in Fig. 3, each front end of hood support **18** may be connected to a vertical side bar **24**, the side bars **24** extending downwardly on each side for connection to an arcuate, outwardly convex, lower support **25** provided with clips **26** for receiving the lower end of an arcuate, transparent face plate **27**, which extends between the side bars **24**. An arcuate, outwardly convex, upper support **28** extends from one side bar **24** to the other side bar **24** and slightly rearwardly thereof, being connected at each end both to the respective side bar and to the front end of hood support **18**, as in Fig. 4. Face plate **27** may extend upwardly within the upper support **28** and be retained in position by the inner edge of support **28** and by engagement with the side bars **24**, as well as by clips **26**.

In order to completely enclose the head of the user, a cover C is removably attached, as by female snaps **30** of Fig. 1 which engage male snaps **31** mounted in suitable positions on the framework, as on side bars **24**, lower support **25** and an arcuate visor **32** which is outwardly convex and attached to upper support **28**, or to the upper support

28 in the event visor 32 is not utilized. As will be evident from Fig. 1, snaps 30 surround an opening 33 in the cover C, which permits the operator to see through face plate 27. Cover C may be formed of one or more layers, such as two, of rubber, plastic or fabric. The material may be treated to be fire-proof or to prevent the filtration therethrough of objectionable mists, fumes or gases, such as acids and the like. Of course, the air inside the cover normally prevents the filtration therethrough of liquids or gases. Each layer of cover C is open at the bottom and the outer layer 34 is conveniently provided at its lower end and at each side with a slot 35 to accommodate the shoulders of the user, while the inner layer 36 of cover C may be provided with a rim 37 around its lower edge to accommodate a drawstring so that the lower edge of the inner layer 36 may be drawn securely about the neck of the user. Visor 32 may be attached to upper support 28 by the same rivets by which male snaps 31 are attached.

In accordance with this invention, the auxiliary hose 13 may be attached to the rear side of the hood support 18, as by a clamp 39 of Fig. 3, the auxiliary hose 13 extending to a cross 40, from which a tube 41, conveniently formed of flexible plastic, such as polystyrene, extends upwardly and over the framework to the upper support 28. Tube 41 supplies air to the operator for breathing purposes, the flow of air being regulated by a suitable valve, such as provided by a valve plate 42 adapted to compress the tube 41, valve plate 42 being mounted on the underside of upper support 28 adjacent the upper edge thereof by a fixed screw 43 and an adjustable thumb or wing screw 44 by which adjustment of the amount of compression of tube 41 between upper support 28 and valve plate 42 is made, to regulate the flow of air for breathing purposes. Wing screw 44 is preferably adjustable from the outside and therefore the thumb screw extends through the cover C, as by forming a slit in the latter and overlapping the edges of the slit. A foraminous member 45, such as cloth or fine wire screen, may be placed over the end of tube 41 and attached thereto to diffuse the air to prevent a direct stream thereof from impinging on the operator's head. It will be understood, of course, that other types of valves may be used to regulate the flow of air for breathing purposes, as well as other types of air diffusers, although the types shown are quite simple and economical to produce.

In further accordance with this invention, from each side of cross 40, a tube 47 may extend alongside the hood support 18 and be connected to the respective opposite ends of an air screen tube 48, which may be secured in position around the lower edge of upper support 28, as in Fig. 4, mounted on upper support 28 and on hood support 18, in any suitable manner, as by a series of clamps 49. The air screen tube 48 is conveniently made of a relatively flexible plastic, such as polyethylene and is provided with a slit 50 extending longitudinally therearound from the position of one side plate 24 to the opposite side plate 24. Slit 50 is normally closed, being merely a knife slit or the like and exaggerated in thickness in Fig. 4 for clarity of illustration, and is positioned so that a stream of air is discharged therefrom, when air under pressure is supplied to screen tube 48 and the tube is slightly distended to cause the slit 50 to open, in a downward direction beneath the inner edge of the visor 32 and slightly outwardly from face plate 27. However, it has been found insufficient merely to direct a stream of air downwardly toward or outwardly from face plate 27, since the circulation of air thereby produced appears to cause a mist of paint particles in the air, for instance, to be drawn upwardly towards the face plate behind the air screen and be deposited on the face plate. Thus, an arcuate deflector 51 is placed at the upper edge of the face plate 27, as by being attached to the lower edge of upper support 28 to extend downwardly and outwardly at an angle to the face plate. The true effect of the deflector 51 is not completely known, although it appears that it tends to produce eddy currents on the inside of the air screen, causing the space in front of the face plate to be filled with air from the air screen, and thereby prevent a mist or spray of paint particles from being drawn upwardly into contact with the face plate. In any event, without the deflector 51, it was found that the hood could be used only for a short period of time before paint spots appeared on the face plate, which ultimately covered the entire face plate. The visor 32 also appears to perform a desirable function, i.e., preventing paint deposited on the top of the hood from running down onto the air screen tube 48 and perhaps clogging the slit at various points or collecting on the lower portion of the tube and being blown onto the deflector 51 or onto the face plate. Of course, any paint blowing onto the deflector 51 will tend to drop off the lower edge thereof and be blown by the air stream onto the face plate. It will be noted that the deflector 51 need extend only across the upper portion of the face plate, i.e., between the side bars 24, but that the slit 50 in tube 48 should be continued to a point rearwardly of the side edges of the face plate, in order to prevent paint particles from being sucked onto the face plate from either side.

The hose 13 may be made of a plastic tube, such as a polyvinyl resin or polystyrene, and the tube 40 may be made of the same material, while the tube 41 may be made of any suitable material, such as the same material as tube 13. Air tube 48 may be polyethylene which is sufficiently flexible that the slit 50 will tend to be closed except when the slit is opened slightly by distention of the tube due to air pressure. Thus, flexible polyethylene is a preferred material for air screen tube 48, although other materials having an equivalent resilience and flexibility may be used. It is to be emphasized that certain polyvinyl resin tubes which can be bent to shape and are comparatively flexible to a slight lateral pressure, have been found suitable. It would be assumed, of course, that a metal tube could be used, but this has not yet been found practicable in actual practice, since a slit which could economically be made in a metal tube has been found to be too wide and require too great an air pressure to provide a suitable air screen, although it might be possible with expensive perforation tools, to make a slit sufficiently narrow that a suitable air screen could be produced. Also, it should be noted that a series of holes drilled at closely spaced intervals along the position of slit 50, in both a metal and a plastic tube, did not operate satisfactorily. Thus, paint particles were deposited rather rapidly on the face plate with the use of an air screen attempted to be produced by a tube having such holes. It appeared that even with an extremely small spacing between the holes, the individual jets of air thus produced tended to suck paint particles or paint mist between them, and the paint particles or mist so drawn between the jets traveled to the underside of the air screen and from there a sufficient portion thereof were deposited on the face plate to cause the face plate soon to be clouded up. It is, of course, evident that if the face plate becomes clouded, the visibility of the operator is seriously impaired and that it is highly undesirable for the operator to have to suspend operations every few minutes, leave the enclosure and wipe off the paint deposited on the face plate.

In operations where safety requirements require the use of a protective helmet for the head of the operator, the hood of this invention may incorporate a so-called "hard hat," which is usually a shell formed of multiple layers of plastic impregnated fibers, the shell being provided with conventional parts on the inside for mounting or attaching the same to the head of the operator. Thus, as in Fig. 5, a hood which includes a protective helmet H may be provided with suitable side bars, similar to the side bars 24 for attachment to a lower support 25 for a face plate 27. The helmet H may be attached to the head of the wearer in a conventional manner, therefore not shown, while the air screen tube 41 may be attached to the under-

side of the helmet H adjacent the front edges thereof, or to an upper support for the face plate 27, while deflector 51 may be mounted on the face plate upper support. The auxiliary air hose or tube 13 may be attached to the underside of the helmet at the rear end connected by suitable means with the air screen tube and also with an air discharge valve controlled by a handle 53, which extends through the helmet H so as to be accessible from the outside. A cover C', similar to cover C, except that it extends merely to the rim of helmet H and may be attached to the outside thereof, as by snap fasteners 30, or may be attached to the underside, if desired, is utilized. The remainer of cover C' may be similar to cover C, as described before.

In the modification illustrated in Fig. 6, an air screen tube 48 may extend around an upper support 28', similar to upper support 28 of Fig. 4, except that it is provided with a bead 55 for receiving tube 48 and holding the same securely in position. Also, a visor 32' may extend around tube 48 in a position similar to visor 32 of Fig. 4, except that visor 32' may be shorter in its transverse dimensions than visor 32. Also, a deflecting plate 51' may be attached to the lower edge of upper support 28' and extend downwardly and outwardly from face plate 27.

In the modification illustrated in Fig. 7, an air screen tube 48 may be placed in a curve 56, formed adjacent the lower edge of an upper support 28'', so that the lower edge 57 thereof may continue downwardly and outwardly to form a deflecting plate. Also, a visor 58 may extend downwardly past tube 48, but be relatively straight in transverse section, being attached along its upper edge to upper support 28''. The lower end 59 of visor 58 may curve upwardly, as shown, to form a trough for collecting accumulated paint or other liquid which flows from the top of the hood and tends to run downwardly, thus decreasing considerably the possibility of such collected paint or the like dripping onto the face plate in the event that the hood is tipped upwardly after the air is shut off.

During use of the hood of this invention, the operator may move his head in any direction and also may look upwardly or downwardly, without paint in the air or paint dripping from a freshly painted surface falling onto the face plate, since the air stream is continuous and not only blows away paint particles or mist, but also deflects any drops of paint or the like falling thereon from above. Furthermore, since the air stream is always discharged in the same fixed position in relation to the face plate, the operator may paint while in reclining position in order to reach spots which otherwise are relatively inaccessible. Due to the fresh air continuously supplied to the inside of the hood, the operator may, of course, work for a considerable time in an enclosed or confined space without discomfort. The preferred diffusion of the air supplied to the inside of the hood also adds to the comfort of the operator. Also, the operator may work continuously for as long as desired without the face plate becoming clogged with paint and without visibility being impaired. The hood of this invention may be used in industrial plants and the like, despite the presence of noxious fumes or gases or a mist or droplets of noxious material in the air or even liquid dropping from surfaces above the operator, with an adequate supply of air for breathing and also a maximum degree of visibility through the face plate being afforded at all times.

Although specific embodiments of this invention have been illustrated and described, as well as certain modifications thereof, it will be understood that other embodiments may exist and that other modifications or variations may be made, all without departing from the spirit and scope of this invention.

What is claimed is:

1. In a hood for protecting a user from mists, sprays, fumes and the like while permitting visibility of an operation being performed by said user, said hood including a transparent face plate and means for supporting said face plate in a position to permit visibility therethrough by said user, the improvement comprising means for producing an air screen directed outwardly and downwardly from a position adjacent the upper portion of said face plate; and a deflector mounted on said supporting means and extending outwardly and downwardly adjacent said face plate and between said face plate and said air screen means.

2. A hood for protecting a user from mists, sprays, fumes and the like while permitting visibility of an operation being performed by said user, comprising a transparent face plate; means for supporting said face plate in a position to permit visibility therethrough by said user; means for covering substantially the remainder of the head of said user; a tube extending laterally adjacent the upper end of said face plate and having a slit therein, said tube being sufficiently flexible that said slit tends normally to be closed but is distended by air pressure in said tube; and means for supplying air under pressure to said tube.

3. In a hood as defined in claim 2, wherein said air supply means is connected to each end of said tube.

4. In a hood as defined in claim 2, wherein said face plate is transversely arcuate; said tube extends arcuately around the upper edge of said face plate; and the lateral extent of said slit is greater than the lateral extent of the exposed portion of said face plate.

5. In a hood as defined in claim 2, including a deflector mounted on said supporting means and extending outwardly and downwardly adjacent said face plate and between said face plate and said tube.

6. In a hood for protecting a user from mists, sprays, fumes and the like while permitting visibility of an operation being performed by said user, said hood including a transparent face plate and means for supporting said face plate in a position to permit visibility therethrough by said user, the improvement comprising means for producing an air screen directed outwardly and downwardly from a position adjacent the upper portion of said face plate; a deflector mounted on said supporting means and extending outwardly and downwardly adjacent said face plate and between said face plate and said air screen means; and a visor disposed above said air screen means and extending outwardly beyond the same.

7. In a hood as defined in claim 6, wherein said air screen means includes a tube extending laterally adjacent the upper end of said face plate and having a slit therein, said tube being sufficiently flexible that said slit tends normally to be closed but is distended by air pressure in said tube; and means for supplying air under pressure to said tube.

8. In a hood as defined in claim 6, wherein said visor is provided with an upturned lip around its lower edge.

9. A hood for protecting a user from mists, sprays, fumes and the like while permitting visibility of an operation being performed by said user, comprising a transparent face plate; means for supporting said face plate in a position to permit visibility therethrough by said user; means for covering substantially the remainder of the head of said user; means for producing an air screen directed outwardly and downwardly from a position adjacent the upper portion of said face plate; additional means for supplying air to the interior of said hood; and means for adjusting the flow of air from said interior air supply means, said adjusting means being accessible for adjustment from a point exterior of said hood.

10. A hood as defined in claim 9, wherein said interior air supply means includes a tube and valve means adjacent the end of said tube.

11. A hood as defined in claim 10, wherein said air screen means includes a tube disposed adjacent the upper end of said face plate; and means for supplying air to each end of said air screen tube and to said interior air supply tube.

12. A hood as defined in claim 10, wherein said hood includes a rigid protective helmet.

13. A hood as defined in claim 10, wherein said interior air supply tube is flexible and said valve includes a plate for clamping said tube; and foraminous means covering the end of said tube.

14. In a hood as defined in claim 2, wherein said supporting means includes an outwardly convex member disposed above said face plate and provided with a laterally extending groove receiving said tube.

15. In a hood as defined in claim 1, wherein said supporting means includes an outwardly convex member disposed above said face plate; and said deflector is formed by the lower edge of said member.

16. In a hood as defined in claim 15, including a visor extending outwardly beyond said tube and attached to said member.

17. In a hood as defined in claim 15, wherein said member is provided with an offset portion receiving said tube.

18. A hood for protecting a user from mists, sprays, fumes and the like while permitting visibility of an operation being performed by said user, comprising a framework having means for adjustably mounting the same on the head of a user; a transversely arcuate, transparent face plate; means attached to said framework for supporting said face plate in a position to permit visibility therethrough by said user; an outwardly convex member supported by said framework and having a lower edge which extends around the upper edge of said face plate; means for covering the remainder of the head of said user; a tube attached to the lower edge of said member and extending laterally adjacent the upper end of said face plate and having a slit therein, said tube being sufficiently flexible that said slit tends normally to be closed but is distended by air pressure in said tube to produce an air screen directed outwardly and downwardly; a deflector mounted on the lower edge of said member and extending outwardly and downwardly and between said face plate and said air screen; an arcuate visor attached to said member above said tube and extending outwardly beyond said tube; an air supply line leading to the rear end of said framework; an air supply tube extending laterally around each side of said framework from said supply line to the respective end of said air screen tube; an interior air supply tube extending over said framework and beneath said covering means from said air supply line to a point beneath said member; a plate for constricting said interior air supply tube for regulating the flow of air therethrough; a wing screw extending through said member and said plate for adjusting the pressure of said plate against said interior tube, said bolt being accessible for adjustment at an exterior point; and foraminous means enclosing the end of said interior tube for diffusing air flowing therefrom.

References Cited in the file of this patent

UNITED STATES PATENTS

2,560,215	Christensen	July 10, 1951
2,579,942	MacLean	Dec. 25, 1951
2,771,320	Korwin	Nov. 20, 1956

FOREIGN PATENTS

853,389	France	Dec. 7, 1939
1,060,227	France	Nov. 18, 1953
1,098,537	France	Mar. 9, 1955