Aug. 26, 1941. C. W. SIRCH 2,253,538

GAS MASK RESPIRATOR

Filed Jan. 21, 1938 3 Sheets-Sheet 1

FIG. 1

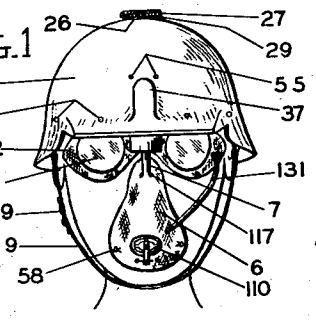


FIG. 2

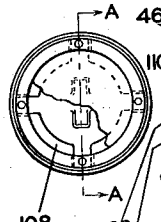


FIG. 3

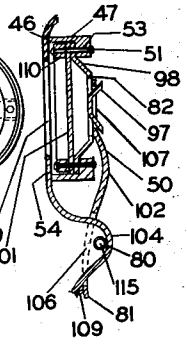
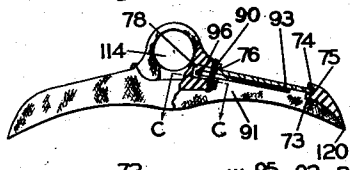


FIG. 4



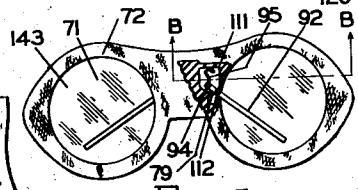


FIG. 5

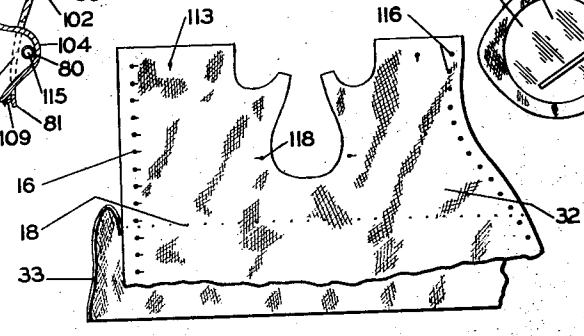


FIG. 6

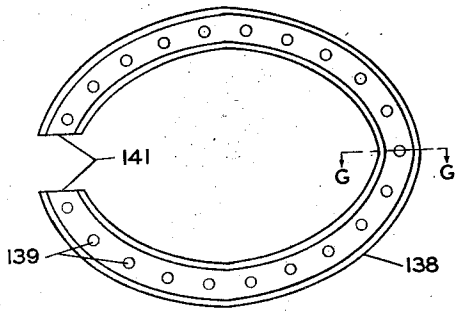


FIG. 7

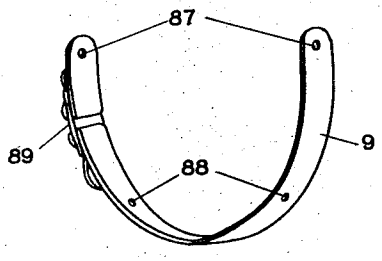


FIG. 9

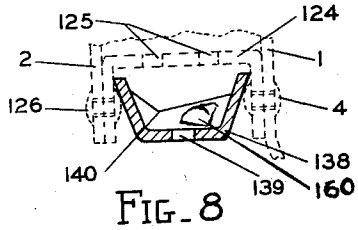


FIG. 8

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GAS MASK RESPIRATOR

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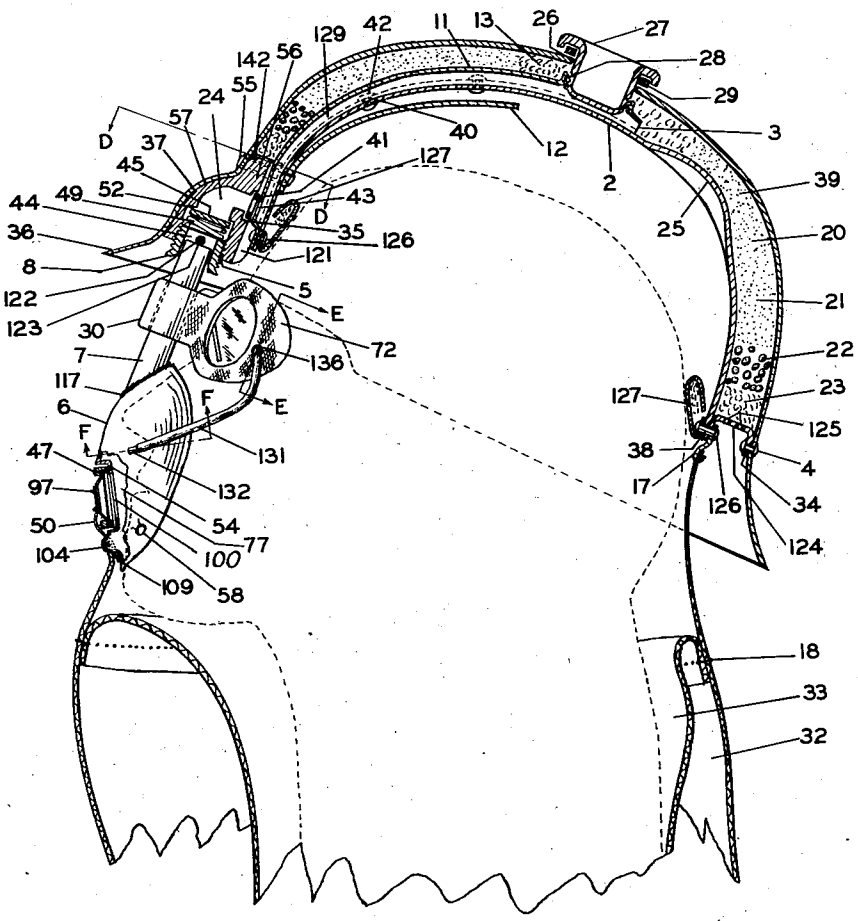


FIG. 10

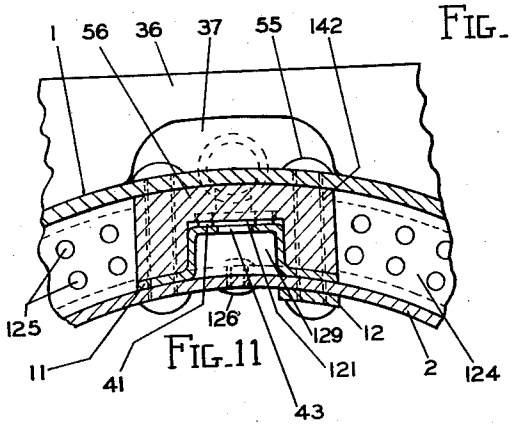


FIG. 11

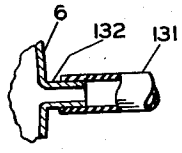


FIG. 12

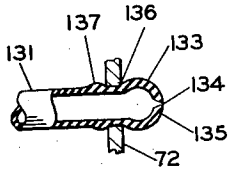


FIG. 13

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GAS MASK RESPIRATOR

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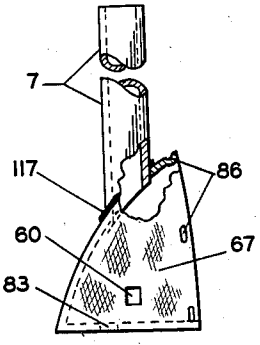


FIG. 14

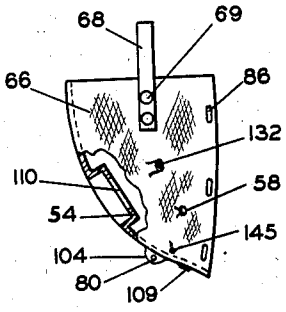


FIG. 15

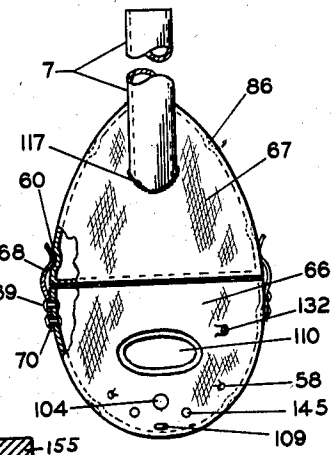


FIG. 16

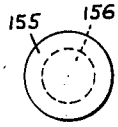


FIG. 26

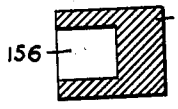


FIG. 27

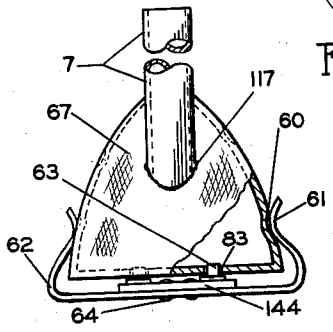


FIG. 17

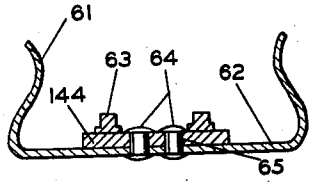


FIG. 18

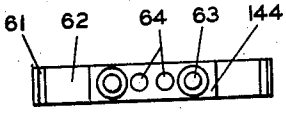


FIG. 19

FIG. 22

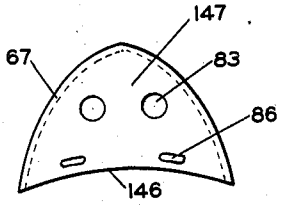


FIG. 20

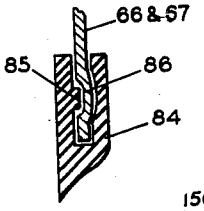
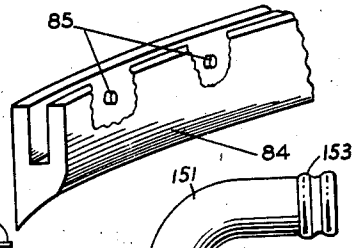


FIG. 21



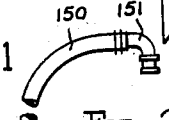


FIG. 23

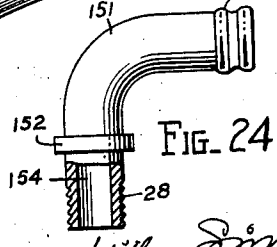


FIG. 24

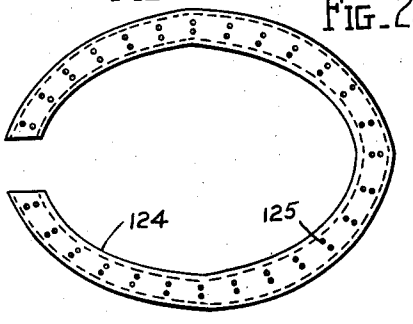
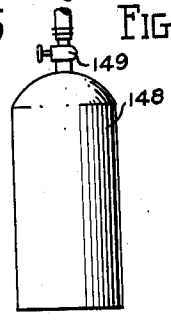


FIG. 25



Charles William Sirch

INVENTOR.

Patented Aug. 26, 1941 2,253,538

UNITED STATES PATENT OFFICE

2,253,538

GAS MASK RESPIRATOR

Charles William Sirch, Los Angeles, Calif.

Application January 21, 1938, Serial No. 186,166

10 Claims. (Cl. 128—141)

This invention relates to respirators or gas masks for protecting the head as well as the respirational tracts from dangerous or objectional matters, vapors, gases or suspended or projected solids.

Among the disadvantages found in even the most recently proposed or used equipment for these purposes are obscuration of the vision, stoppage, disconnection, interference, discomfort and strain resulting from straps and the supporting means generally. An outstanding disadvantage has existed in the fact that the wearer, who has been incapacitated and has fallen, is apt to be prevented from receiving the protection for which gas masks are designed, at the very time when he is unable to flee from the zone of danger. Another disadvantage results from awkward means of suspension and location of the parts and particularly of straps so as to cause unnecessary interference and strain or danger or both to the wearer; elongated hose or protruding parts are apt to come in contact with other objects, either stationary, as brush or tree branches, or moving, as arms, bayonets, machinery and the like. In one recent construction the area of the filter is limited, either by the diameter of a disk which can be supported as positioned, so that even despite its shakable center it is apt to soon become insufficient to prevent unduly high breath resistance, or total stoppage of air may occur in case the wearer falls. In several gas masks it is found practical to carry only a restricted or limited filter area so that only coarse granules of adsorbent can be used whereas it is well known that far more efficient adsorption may be achieved if finer particles are used.

It is among the objects of this invention to provide a protective respirator gas mask equipment which is efficient, safe, rugged, durable, comfortable and adapted to be operative when the wearer thereof is incapacitated and which can be readily and inexpensively manufactured and embodies other advantages which will appear from the specification and claims. One of the chief objects of my invention is a construction which protects the filter as well as the head of the wearer; also a construction which, instead of being an additional cumbersome burden even when not in use, for breathing, is at all times an ideal protective headdress when its removable face-piece is disconnected.

A further object is to provide a gas mask construction whereby is prevented obscuring of the vision, either by parts such as the tube, hose, filter, goggles or face-piece or by condensation on lenses caused by circulation of vapor, as the breath; also having a face piece which readily permits the ejection of saliva, which is sometimes so necessary when coughing, or of the voice by means of a removable exhalation valve; also whereby the collapse or loss of the filter effluent tube does not prevent the user from breathing filtered air; also which is adapted for having interchangeable parts so that the equipment may be used to supply either filtered air or special gases; also which may be used by man or beast.

To the accomplishment of the foregoing and such other objects as may hereinafter appear the invention resides in the combination of the elements, arrangement of the parts and in the details of construction as hereinafter particularly described and then sought to be clearly defined by the claims, reference being had to the accompanying drawings forming a part hereof, and in which

Figure 1 is a perspective mask and filter assembly embodying features of the invention

Figure 2 is a rear view of the exhalation valve disc assembly with parts cut away to show the supporting spider arm **97** Figure 3

Figure 3 is a sectional view of the valve taken along the line A—A Figure 2 and having the lower part of the valve seat **54** together with a bearing **104** formed in the face-piece **6** supporting the spring **50**

Figure 4 is a perspective view showing the upper part of the goggles referred to Figure 5, with parts cut away to show the wiper mechanism and parts

Figure 5 is a rear perspective view of the goggles with parts cut away to show wiper parts more clearly

Figure 6 is a perspective view of the cowl

Figure 7 is a plan of the false-bottom showing air-inlet perforations **139**

Figure 8 is a section taken along the line G—G Figure 7 and indicating supporting members therefor

Figure 9 is a perspective view of the chin strap

Figure 10 is a side-elevational view of the gas mask unit, partly in section and partly perspective, with parts cut away in the face-piece **6** to show the valve seat

Figure 11 is a sectional view taken along the line D—D Figure 10 to show the air duct and valve fitting **37**

Figure 12 is a sectional view of a blower coupling **132** taken along the line F—F Figure 10

Figure 13 is a sectional view of the blower out-

let taken along the line E—E Figure 10 and showing part to the goggle frame.

Figure 14 is a side elevational view of the upper one of the parts of a divided face-cone

Figure 15 is a side elevational view of the lower one of the divided face-cone parts

Figure 16 is a front view of these divided face-piece parts showing support means and showing the tubular section of the tube 7

Figure 17 of the face-piece shown in Figure 17 with closure means

Figure 18 is a side view of the closure means

Figure 19 is a top view of the closure means

Figure 20 is a bottom view of the divided face-piece parts showing the partition 147 and also showing the edge of face-pieces 67—6 curved to fit the contour under the mouth of the user; also showing means for fitting and gasketting the joint

Figure 21 is a sectional view of the fitting and gasketing means

Figure 22 is an oblique view showing details of these means

Figure 23 is a perspective view showing means for supplying special gases

Figure 24 is a sectional view of the coupling

Figure 25 is a plan of the filterbottom 124

Figure 26 shows the cap 155

Figure 27 is the sectional view of the cap 155

Novel means are provided for durably and efficiently conducting filtered air from the helmet to the user's respiratory system. The filtered-effluent delivery tube 7 is positioned interorbitally to reach the face-cone 6.

In the embodiment shown in Figure 1 the outer casing 1 is preferably provided with an opening 26, which is normally sealed by the screw-cap 27 and gasket 29; also with openings 34 for rivets 4, which support the filterbottom 124 Figure 10; also with rivetholes 142 for rivets 55 which support the effluent-valve fitting 56 Figure 10 and inner casing 2 Figure 10, the effluent tube 11 and the holder 12 thereon; also with a visor 36 Figure 1 formed of the part of the brim which is in front of the head of the user. The face-cone is provided with pegs 58 to co-operate with peg openings 118 Figure 6; and with opening 88 in the chin-strap 9 Figure 9; also with exhalation opening 100, which normally is shut off by the diaphragm 101 Figure 3 serving also as a valve, its edge being stiffened by a clamping ring 110 and 47.

As shown by a lower part, in section, in Figure 3, of the cone 6 its anterior surface around the exhalation opening 100 is shaped to form a seat for the valve assembly shown in Figures 2 and 3. The seat 54 is normally covered by the face 46 of the valve disk-frame 47, held thereon by the pressure of the spring 50, turnably mounted on an extrusion 104 in the face-cone 6, and held thereon by a pin 115 in openings 80 therethrough. The spring 50 has an opening 106 to admit the extrusion therethrough near the base 81 of the spring mounted against the face-cone 109. Passing through another opening 107 in spring 50 two clamping-arms 97 of the spider 82, fixedly mounted on the valve frame 47 by rivets 51 passing through openings 53 in 47, in the clamping ring 110, in the spiderlegs 98 and in the diaphragm 101 and holding the members of the valve-disk assembly together, serve to hold the disk against the seat.

Novel means are provided whereby, without detaching any parts of his gas mask, the user may shift from filtered air to atmospheric air. Also whereby his voice may be projected through the port 100 directly to the atmosphere instead of through the diaphragm 101. The extrusion 104 constitutes a pivotal bearing for the spring 50 and by simply seizing the spring at its bent portion 102 its free end, which supports the diaphragm 101 he may lift the attached valve from its seat and swing them to either side of the port or cone piece to be held there by the spring pending a possible warning of a gas attack.

Novel means are provided for permitting the voice vibrations to pass from the chamber 77 through the opening 100 whether the valve be shut or open, and novel means are provided for normal breathing of atmospheric air without removing the mask. The central part of the thin diaphragm 101, which may be made of any suitable air-impervious material, is adapted to be vibrated, by the vociferation of the user and thereby to communicate the vibrations thereof to the exterior of the member 6, when the valve disk assembly is firmly pressed against the seat, openings 108 in the spider 82 being provided to permit the vibrations to emerge therethrough to the atmosphere or outside of the mask. During exhalation the pressure of the breath of the user lifts the disk assembly, of which the diaphragm 101 actually has an area substantially sufficient to cover the area of the port 100, and the breath flows outside and past the edges of the diaphragm and the frame 47, to the atmosphere. The diaphragm 101 is adapted to be sealed so that no gas can pass through these members, in other words the area of the disk substantially equals the area of the diaphragm plus the area of face 46. Naturally when the disc assembly is held from its seat the exhalation passes the perimeter of the face 46 directly from the port to the atmosphere. Near its face 46, the bore of the frame 47 is enlarged to admit diaphragm 101 and ring 110 and preferably four radial channels are provided in 47 to hold spiderlegs 98. All parts of the valve assembly may be of metal or other suitable material. The clamping arms 97 are preferably formed by making a U-cut in the spider piece as shown. It will be noted that, when the valve is shifted to one side, it will be possible for the user to discharge sputum through the opening 100.

A novel support for goggles, a novel means for causing them to be pressed against the face so as to exclude smoke and the like, novel means to exclude vapor of the breath and novel means for wiping condensation from the interior or back of the glass have been provided. The opening 114 Figure 4 in the goggle frame 91 is adapted to be frictionally supported on the tube 7, which may be extended therethrough, so that the goggles will be positioned and pressed against the face of the user. The goggle frame may be made of metal with a rubber edge gasketing the brow around the eyes, as described in another paragraph herein, or the frame may be made of any suitable material, such as rubber, as shown in Figures 4 and 5. The feathered edge 120 encircles both eyes so that a chamber 91 is formed between the glasses and the user's skin. The contoured rubber wall of the frame 72 has suitable openings 143 for glass 71 or the equivalent and is channeled 75 to hold the glass. An extension 76 of this channel forms a chamber 78 for housing a wiper mechanism of which a protuberance of the wall may serve as a spring 79, by which wiper parts are normally held aside from the sight of the user. A strip of chamois 93 is

held positioned against the surface of the glass by the free arm of the lever 92, which is preferably made of U-section metal for stiffening and also for holding chamois in the channel formed within the U-bend. The lever 92 has openings 112 constituting rudimentary bearings with the shaft of the rivet 90 therethrough and supported by the rubber frame in openings 91 therein; also rudimentary bearing openings 94 for the pivots 96, formed by deformation of the end of the push-rod 95. The pushrod is positioned and guided by the walls of the chamber, an area of thin wall 111 being provided so that it may be depressed by the user to actuate the lever with his finger when condensation occurs on the glass from his tears.

For covering remaining portions of the head and neck and also to prevent objectionable matter from entering in his collar novel means are provided. The cowl-piece 32 Figure 6 has supporting means 118 cooperating with pegs or means 58 in cone 6; also 113 and 116 for suspension on the hook 17 and for holding 32 in tubular form about the head of the user together with the buttons 116 and cooperating holes 16 or suitable sealing means. A tuck-piece 33 is sewn or suitably attached 18 to 32 so that when the free end of the piece 33 is tucked under the clothing of the user dust or the like will tend to be arrested in its passage by these parts and by the volume of air which is trapped between the parts 33 and 32, which are preferably made of oiled textilaceous material.

Novel means are provided for sealing the influent opening of the filter; also for adding to the normal filterbed such additional neutralizing media as may be required for newly developed so called surprise gases. In Figures 7 and 8 an auxiliary bottom 138 is adapted to be supported frictionally, by the heads of the rivets 126 and 4, under the filter inlet. When it is desired to supply additional filter media or air tempering substances for example cracked ice 160 during an emergency, the bottom 138 is adapted to serve as a tray upon which such media may be supported and in which perforations 139 admit the air so as to permit it to pass through the media. When it is desired to seal the filter from atmospheric air the false bottom 138 is made without the perforations 139 as will be readily understood.

A chinstrap 9 Figure 9 having openings 87, for attaching to rivets 4 therethrough or equivalent co-operating means for support, and a buckle 89 for adjustment, also has openings 88 to co-operate with pegs 58 in the face cone 6 so that the face piece assembly may be held close to the skin by the tension of the chinstrap.

Novel means have been provided to construct a filter such as will be adapted to have large filtering capacity, a low velocity of approach of the raw air, a minimum of frictional resistance, means for ready control and also for re-activation and for replacement of filter media and parts; also for its suspension upon the head of the user so that its parts will tend to have the least tendency to hinder the movements of the user; also to have the filter parts serve as a protection against impacts on the head of the user, thereby enabling a corresponding reduction in the weight of other protective equipment such as a steel helmet. In Figure 10 the filter bottom 124, having perforations 125 and rivet holes 34, for rivets 4 and 126 therethrough, and by which it is attached to the outer casing 1 and inner casing 2 of the filter chamber 39, supports the filterbed 20. The raw air enters through the perforations in the filter bottom and—without obstructions such as valves—passes into the filter chamber whence the filtered air enters a port 3 in the end of the effluent tube-piece 11, passing down through the bed, to the effluent-valve fitting 56, which has a socket 44 for the tubular end 7 of the facecone therein.

Rudimentary co-operating threads 28 in the covercap 27 and in the tube-piece 11 are disposed to hold, and to enable a person to screw the cover 27 tight against the gasketed 29 opening 26 and thus support the skullcap or inner casing 2 which is riveted 42 to the tube-piece so that between them a tube or effluent duct is formed by these pieces 11 and 2.

It will be noted that the inner casing 2 occupies the central part or like a core in a filterbed so as to form a wall for the chamber 39. Corrugations 25 in casing 2 are adapted for housing the facepiece 6 when the end of the hanger 12 is inserted in the tube 7 when not used as a respirator. Rivets 55 passing through rivet holes 142 in the hanger, the casing 2, tube piece 11 the fitting 56 and outer casing 1 support these members.

The tube-piece 11 is bent and riveted to the casing 2 near the lower edge of these parts so as to leave no outlet except where an opening 43 has been provided in 11.

The tube-piece 11 is adapted to be enlarged so as to extend over a considerable area of the surface of the inner casing 2. And both parts 11 and 2 are adapted to be made of spring steel, suitably hardened and of suitable thickness to afford the maximum protection to the head of the user because the dimensions of these parts may be considerably smaller than the dimensions of the bowl of a standard steel helmet or of casing 1.

The outlet valve-fitting 56, positioned in the niche 57 formed in the casing 1 by the bulge 37, has a chamber 24 and a recessed opening 35 admitting to the effluent opening 43 through the gasket 41 between these parts. A seat 52 in the chamber co-operates with the valve disc 45, held by spring 49, mounted on a socket piece 8, to hold the valve normally in closed position. To enable the tension of the spring to be adjusted so that the valve will be opened by the differential pressure created by the muscular exertion during inhalation by the user co-operating threads 5 are provided on the outside of the socketpiece and on the inside of the wall of chamber 24. An annular bore 44 in the socketpiece is adapted to serve as a frictional support for the airpipe 7 which is prevented from jambing the spring by a pin 122 supported in openings 123 in the wall of the socketpiece.

Adjustment or sweatpad means 127, adapted to cover parts which might be hard on the head or scalp of the user, are supported by rivets 38 therethrough and through parts 11 and 2.

The filterbed 20 may be built up of any suitable media, preferably a cotton pad or layer of fibrous material 125, supporting salifying material in a layer 22 or mixed with adsorbent material, such as carbon in an activated state, 21. To prevent the materials from shifting about the chamber 39 and also to screen the effluent orifice 3 a pad or pack of fibrous or hairy material is placed on top of the filterbed as shown.

Figure 11 shows how the tube-piece 11 is shaped to fit into a channel or niche 121, in the fitting 56. Although shown deep, for clearness of the drawings, the channel may be shallow and corre-

spondingly wide to provide the desired airduct area 129 when the piece 11 is proportioned correspondingly thereby covering more of the scalp.

Novel means are provided whereby the valves are adapted to act and to respond in the minimum period of time to the user's impulse of either inhalation or exhalation. The several parts of the covering for the face of the user are adapted to hold a minimal volume of air or breath the expansion or contraction of which, due to elasticity, might cause delay of the differential on the opposite sides of the respective check valves. The parts 6 and 7, particularly, are adapted to hold a minimal volume of air and the other parts of the mask do not contribute to this volume, being separate or shut off.

To enable the user to blow air into the goggle chamber 91 so as to expel possible smoke leakage therefrom a tube 131 having a rudimentary valve end 135 Figure 13 adapted to be inserted in opening 136 and frictionally held 137 therein may be provided by making the opening 136 either as shown in Figure 10 or in another suitable location in the goggle frame. Similarly an outlet tube 132 may be formed in the cone piece 6 covering chamber 77 as shown in Figure 12 and the free end of the tube attached and frictionally held thereon. The check valve 135 is adapted to resist opening by the exhalation pressure such as readily opens the valve in the member 6 but to enlarge the orifice 134 at a higher pressure such as may be exerted when the exhalation valve is held shut.

The members 6 and 7 may be either joined by suitable means such as welding 117 or they may be formed as one piece in any suitable manner.

In Figure 14 the face cone is adapted for covering only the nose of the user who may prefer to leave his mouth uncovered and use his lips as a valve. When the part 67 is substituted for the parts 6 and 7, the disc 45 having previously been removed from the valve fitting, the exhalation may pass through the filter. Obviously, when it is not desired to remove disc 45, an opening and valve parts equipment to those shown in Figure 3 may be provided in the part 67.

By removing the closure member 144 from partition 147, by lifting the spring 62 from the socket 145, the lower part of the facepiece shown in Figure 15 may be attached to the part 67. The rubber edge strip 84 is adapted to skirt the edge of these members, to be adjustably held thereon by the co-operating depression 86 and protuberances 85 and suitably joined by cementing or taping joints.

When it is desired to breathe special gases the fitting 151 Figure 24 is adapted to be substituted for the covercap 27 and the free end attached to the source or gas tank 148 by means of the tube 150 as will be readily seen in Figure 23. Regulating means 149 are provided to control the gas.

For closing the opening 132 Figure 12 in the face-piece when the tube 131 is detached a cap 155 Figures 26–27 is provided for an opening 156 to fit the part 132.

Some of the advantages resulting from this invention are a gas mask which is an armored protection for the user's head; the elimination of a long flexible short-lived effluent tube and other encumbering parts by the substitution of a rigid tube of minimum frictional resistance; the use of the filter casing as a headgear; lower velocity of approach of air at the filter influent; provision for large filter capacity and for rapid modification of the filter media; elimination of exhalations from the goggle chamber; means for removing traces of pungent gas from the goggle chamber and for removing condensation from the glasses; an adjustable effluent valve; a minimum of frictional resistance; a combination of exhalation valve disc and voice transmission diaphragm such as can be made inexpensively; a respiration equipment which can be used either for protection from toxic or irritant gases or dust or can be converted into an inhalator for special gases or vapors; the elimination of more than half the weight of equivalent equipment the user now carries and of about ten of the movements now practiced in donning gas mask equipment; also in which the armored protection consists of a plurality of layers of material which may be metal, in which case I preferably make the layer of spring steel and of sufficient area to cover the desired parts of the head of the wearer; also in which both the exhalation valve and diaphragms are removably supported thereby enabling the user to change instantly to normal breathing and vociferation or to filtered air and diaphragm or to eject sputtum of discharges of his from his respiratory system through the opening 100. Also, whereas the common slit rubber fluttervalve may open when inadvertantly it comes in contact with an obstruction, for example, the earth, the exhalation valve assembly is adapted for withstanding collision and for protecting a fallen user even if the port is entirely obstructed, in which case it may be actually advantageous for him to force his exhaled breath past the junction of the edge of the face-piece and his skin.

Also in which the inlet valve has the maximum responsiveness to its actuating differential between atmospheric pressure and the lower pressure resulting from the muscular action of inhalation; also, obversely of the foregoing, greater responsiveness at the moment exhalation starts, whereas the elasticity of common long rubber tube of necessarily greater diameter and consequently its compressible air content tends to cause a lagging valve and a filling with exhaled breath which is later re-breathed. The exhalation as well as the inhalation valve have greater responsiveness at the moment exhalation starts as compared with the lagging action of corresponding valves in respirators in which said muscular effort is unfortunately compensated for, both by the elasticity of the walls of the long rubber hose heretofore employed in most widely used types of respirators and also by expansion of the greater air content such hose contains.

In practicing the invention I preferably position the axis of the air duct vertically within the triangular horizontal area between and ahead of the eyes of the wearer which is not in his sight normally and which is termed his inter-orbital void. The weight and the members of my construction tend to hold the mask to the face of the user whereas most of the existing gas mask units are disposed to pull the mask from the face, particularly during muscular exertion, and thus to break the seal of the junction of the edge of the face-piece and the skin of the user, especially when parts, as the nose, come in contact with an object as a rifle, harness, pack or burden. The common danger of collapse of the hose and air supply is eliminated by my tube first proportionally to the great difference in their length and second by the rigid construction for which it is adapted. Supported from above and turn-

ing with the head of the user in a minimum radius my construction is an ideal durable gas mask unit for many purposes, including the protection sorely needed for draft animals which thereby can, for the first time, be provided with an adequate supply of filtered air instead of the stifling bag of moistened cheesecloth heretofore employed.

It will now be apparent that I have devised a novel and useful construction, which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which will give in practice satisfactory and reliable results, it is to be understood that the same is susceptible of modification in the various particulars without departing from the spirit or scope of the invention, or sacrificing any of its advantages.

Air tempering or moistening, means **160**, Figure 8, for example cracked ice or warmed pebbles may be added to the filter media and supported on tray **138**, Figure 8.

Having described my invention and set forth its merits what I claim is:

1. In a gas mask or the like, in combination, a face piece adapted to cover the user's mouth and nose and having an opening opposite the user's mouth, and means for closing said opening, said means comprising a valve seat and valve element including a voice transmitting diaphragm, said valve element being spring-held against its seat, for transmitting voice vibrations through said opening, a helmet having filter means therein and a rigid tubular connection between the helmet and face piece.

2. A gas mask in accordance with claim 1, in which said face piece is detachably connected with the front of the helmet.

3. A gas mask in accordance with claim 1, in which said connection comprises a duct positioned so as to traverse the axis of the user's inter-orbital void.

4. A gas mask in accordance with claim 1, in which the face piece has a plurality of chambers including a breathing chamber, and an eye chamber and a duct connecting said chambers including a pressure operated valve.

5. A gas mask in accordance with claim 1, in which an eye chamber and glasses are attached to said tubular connection, and means for removing condensation from the glasses including a wiper, a chamber having a deformable wall, and means adjacent the wall for operating the wiper when the wall is deformed.

6. In a gas mask, in combination, a face piece, a filter chamber in the form of a helmet adapted to protect the user's head, and a connecting duct between the face piece and said filter chamber, said duct being positioned to traverse the inter-orbital void of the user, said face piece including nose, mouth and eye chambers and constituting with said duct a rigidly constructed unit and a cowl piece supported from the helmet and covering the part of the head of the user not protected by the face piece.

7. A gas mask in accordance with claim 6, in which said face piece is provided with an opening having a valve seat and a valve member including a voice transmitting diaphragm spring-held against its seat, said parts serving to transmit voice vibrations.

8. A gas mask in accordance with claim 6, in which said face piece is provided with an opening having a valve seat and a valve member including a voice transmitting diaphragm spring-held against its seat, said parts serving to transmit voice vibrations, and means for shifting the valve to an inoperable position.

9. A gas mask in accordance with claim 6, in which the eye chambers mounted on said connecting duct are adjustable slidable.

10. A gas mask in accordance with claim 6, in which said eye chambers include goggles, and means for removing vision impairing substances from behind said goggles without removing the goggles from the face including a wiper, a chamber having a deformable wall, and means adjacent the wall for operating the wiper when the wall is deformed.

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