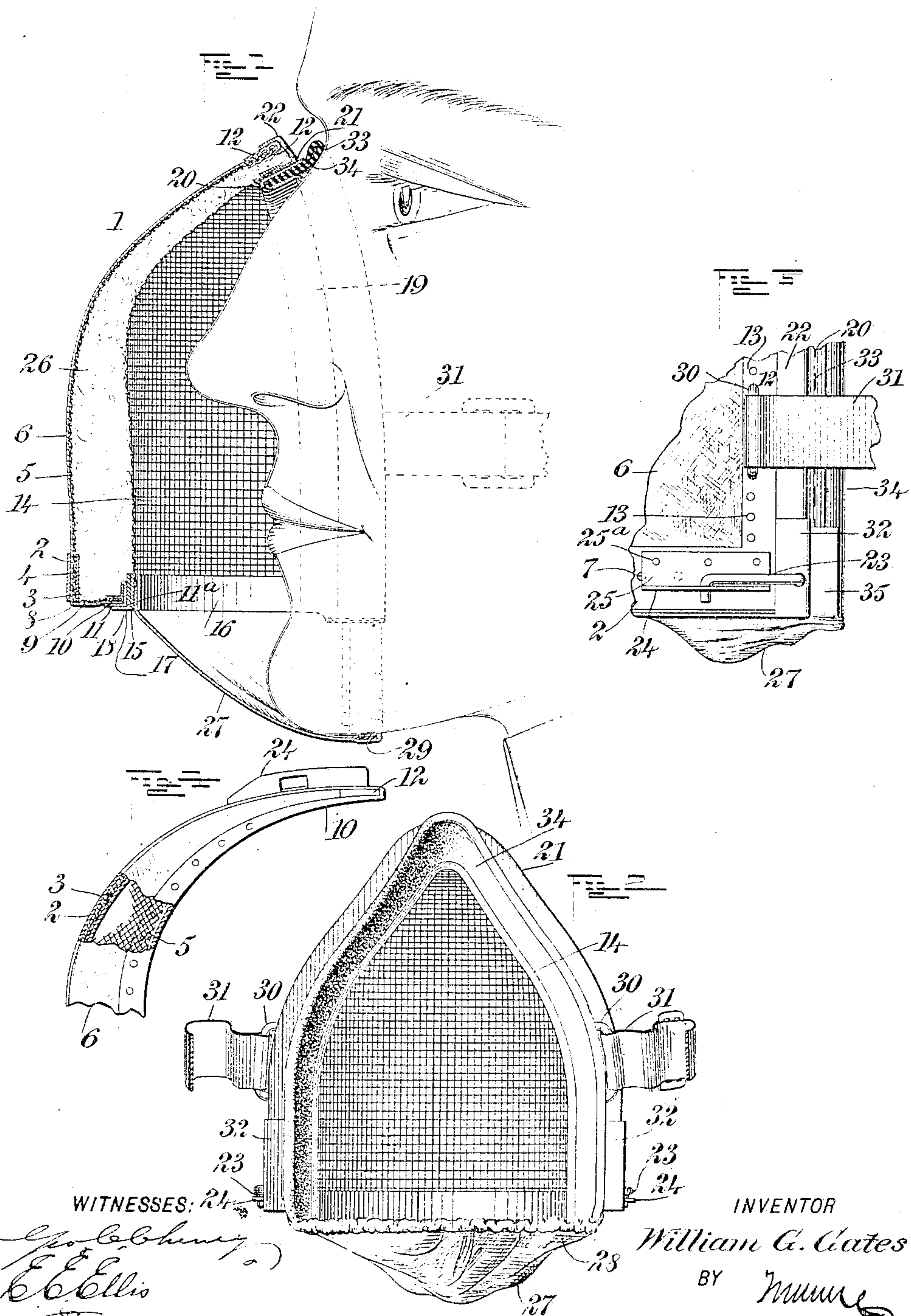


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PATENTED APR. 11, 1905.

W. G. GATES.  
RESPIRATOR.

APPLICATION FILED JULY 15, 1903.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## RESPIRATOR.

SPECIFICATION forming part of Letters Patent No. 787,167, dated April 11, 1905.

Application filed July 15, 1903. Serial No. 165,618.

*To all whom it may concern:*

Be it known that I, WILLIAM GILFORD GATES, a citizen of the United States, and a resident of Fort Benton, in the county of Chouteau and State of Montana, have invented a new and Improved Respirator, of which the following is a full, clear, and exact description.

This invention relates to respirators; and it consists substantially in certain parts and details and combinations thereof hereinafter particularly described, and pointed out in the claims.

One of the principal objects of my invention is to provide means for overcoming numerous disadvantages and objections found to exist with other devices hitherto devised for similar purposes and also to provide a respirator which is simple in construction, strong and light in weight, as well as comparatively inexpensive to manufacture, and readily adjusted to the face of the wearer thereof.

A further object of my invention is to provide a device of the character referred to which is effective and reliable in use, besides not being liable to corrosion nor apt to get out of order, and possessing the capacity for long and repeated service.

The above and additional objects are attained by means substantially such as are illustrated in the accompanying drawings, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical sectional view of my improved respirator and showing the manner in which the device is applied to the face of the wearer of the same. Fig. 2 is a view of the device looking at the same from the inner side thereof. Fig. 3 is a detail side view showing one means by which attachment is effected between the inner and outer sections of the device; and Fig. 4 is a detail view of the outer section of the device, partly broken away and in section.

Before proceeding with a more detailed description it may be stated that in the form of my improvements herein shown I construct the device of two sections, fitting one within the other, each section consisting substan-

tially of a frame, to which is attached in any preferred manner a suitably-shaped body portion of wire-gauze of any desired mesh and stiffness, said frames being provided with means by which the sections are prevented from dislocation relatively to each other and also by which a space is formed between the sections for the accommodation of a suitable filter, as cotton-batting, (though flax or wool may be used,) for filtering the air of dust and other particles and preventing the same from being carried to the respiratory organs of the wearer of the device, the outer surface of the body portion of the outer section of the device being preferably covered with silk or similar material as an additional obstruction to such particles, and while I have herein represented my improvements in a certain preferred embodiment it will be understood, of course, that I am not limited to the precise details thereof in practice, since immaterial changes therein may be made coming within the scope of my invention.

In order to enable my improved device to be readily fitted to the face of the wearer, I provide one of the frames thereof with a flexible border or lip of metal or other material, which may readily be bent to conform to the sides of the nose, cheek-bones, and other parts of the face in such manner as to prevent entrance of air to the interior of the frame except in the manner intended therefor, the special shape of the body portions of the device enabling ample quantities of air to pass to the lungs, as will be apparent.

Any suitable means may be employed for holding the device in position when in use, special means being provided, however, for preventing the device from riding upwardly on the face without interfering with the natural movements of the chin and lower jaw, and I also provide special means for enabling the device to be worn without discomfort and without injury to the face.

Specific reference being had to the drawings by the designating characters marked thereon, 1 represents the outer section of my improved respirator, comprising a frame, preferably of aluminium or other light material, having a base constructed of approximately semicir-



cular duplicate strips 2 and 3, between which is fastened at 4 the lower portion of the body 5 of said section, this body being formed of reticulated material, as wire-gauze, which is of sufficient stiffness to retain the practically hood-like shape to which it is bent, as shown, by which to extend upwardly and toward the bridge of the nose of the wearer of the device and yet stand outwardly a suitable distance from the lower part of the face. The outer surface of this body 5 is covered at 6 with any suitable finely-woven material—as silk, for instance—the lower portion of which covering is fastened between said strips 2 and 3 in like manner as the said corresponding portion of the said body, these strips being secured together in any suitable manner, as by rivets 7, (see Fig. 3,) the lower portions 8 and 9 of both the body and covering being turned substantially at right angles, as shown, (see Fig. 2.) and having their free edges secured between other approximately semicircular strips 10 and 11, (the latter being bent horizontally at 11<sup>a</sup>,) forming a part of the said base, these strips uniting at their ends with the ends of the strips 2 and 3, (see Fig. 4,) and standing upwardly from such ends and secured thereto in any suitable manner are side members 12, forming part of said frame, said members being arched and uniting at the upper part thereof, doubled over, as indicated, and fastened together by rivets 13 or in any other suitable way, the duplicate parts thereof having the corresponding edge portions of both the reticulated body 5 and its covering 6 secured therebetween, as shown. The inner section of my improved respirator consists of substantially a similar body 14, also of reticulated material, having the lower edge portion thereof secured between two other approximately semicircular strips 15 and 16, which are themselves secured together in any suitable manner, as by rivets, (not shown,) the said strip 15 also having secured to the outer side thereof a strip 17, bent or turned horizontally at 18 to lap the under side of the horizontal portion 11<sup>a</sup> of said ring 11 when the said inner section of the device is placed within the outer section thereof. The several strips thus referred to in connection with the said inner section of the device constitute practically the base of the frame of such section, which frame is also preferably of aluminium or like material and comprises upwardly-extending arched members 19, constructed practically of inner and outer strips 20 and 21, which are bent to partly lap each other and to securely hold between them the free edge portion of the said reticulated body 14, as shown at the upper part of Fig. 1, the said outer strip 21 being also bent or doubled over throughout at 22, by which to partially receive and overlap the said doubled-over portions of the binding-strips 12 of the outer body-section of the device. As will thus be

seen, the inner section of the device fits within the outer section in a detachable manner, and to secure the two sections together in the use of the device I may employ any suitable means—as, for instance, hooks 23, pivoted at one of their ends to the lower side corners of the frame of said inner section and engaging at their other ends with suitable openings therefor in flanges 24 of plates 25, secured by rivets 25<sup>a</sup> in corresponding positions on the frame of the said outer section. (See Figs. 2 and 3.) The space or chamber thus formed between the body portions of the two sections of the device has placed therein a pad or suitable quantity 26 of cotton-batting or the like for arresting the dust particles, as already explained, and it will be noted that the said mentioned strips 15 and 16 also have secured between them one of the edge portions of an apron or pouch 27, of suitable flexible material, the other edge portion whereof being shirred or gathered at 28 and provided with an elastic puckering-string 29, causing the said apron to closely fit beneath the chin of the wearer of the device, yet offering no interference with movements of either the chin or lower jaw, as is apparent.

I provide suitable loops 30 at the sides of the frame of the outer section of the device, in which are fastened the ends of suitable elastic or other cords or tapes 31, which may be passed around or over the crown of the head to secure the device in place, as indicated. If desired, suitable attached angle-pieces 32 may be employed for supporting said hooks; but this is of minor importance.

The said mentioned inner strip 20 of the frame of the inner section of the device is of flexible material capable of being bent to conform to the sides of the nose, as well as to the shape of the cheek-bones and other parts of the face of the wearer, this strip being also doubled upon itself, as indicated in Fig. 1, and having secured between the doubled portions thereof, by means of stitching 33 or otherwise, a strip 34, of leather, rubber, or other cushioning material, for direct contact with the face to prevent injury thereto in the use of the device, said cushion also effectually preventing ingress of air at the edges of the device, as is obvious, it being noted that the same is preferably doubled to render the same more soft and yielding. As indicated at 35, the corner portions of the said apron or pouch may be turned upwardly and secured in place by means of said angle-pieces 32; but this also is immaterial in practice.

The advantages of my device will be fully apparent, it is thought, and it will be seen that the use of the device does not in any way interfere with the vision of the wearer nor does it prevent the use of spectacles or goggles at the same time.

A marked advantage in the use of cotton-batting in my device over that derived from



the use of a sponge is that the cotton-batting is sanitary, is more comfortable and convenient to the wearer of the respirator, it does not freeze in cold weather, and is more potent to catch fine dust.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A respirator, comprising an inner section of reticulated material, an outer section of similar material, the two sections being shaped to fit the face of the wearer around the nose and mouth and forming a chamber between them, and an air-filtering medium located in said chamber, said outer section having an outer covering of textile fabric, held thereupon in close engagement therewith.

2. A respirator, comprising two sections of reticulated material spaced apart from each other and connected together around their margins to form a chamber between them, flanged plates secured to one of said sections and hooks pivoted to the other section, the flanges of said plates having apertures adapted to be engaged by said hooks for detachably connecting the sections together, and a mass of filtering medium filling said chamber.

3. In a respirator, a frame having an upwardly-extending section bent to fit the face of the wearer around the nose and mouth, and a horizontally-disposed curved section connected at its ends to the lower ends of said upwardly-extending section, and curving outwardly in advance of the face of the wearer, and an apron of flexible material connected to said horizontal section of the frame, and adapted to fit beneath the chin.

4. A respirator, comprising a frame having an upwardly-extending section bent to fit the face of the wearer around the nose and mouth, and a horizontally-disposed curved section connected at its ends to the lower ends of said upwardly-extending section, and curving outwardly in advance of the face of the wearer, a larger frame similar in form to the other and adapted to fit thereover, means for connecting the two frames together, one spaced apart from the other, a section of reticulated material carried by each of said frames, the sections of reticulated material being also spaced apart from each other to form a chamber between them, a mass of filtering material inclosed within said chamber, and an apron of flexible material connected to said horizontal section of the inner frame and adapted to fit beneath the chin.

5. A respirator comprising an inner sup-

porting-frame formed of bendable material, bent to inclose and fit the nose and front sides of the face, extending down the latter to a point below the mouth and thence curved outwardly and forwardly in a horizontal plane, said frame being filled in with a section of reticulated material extending outwardly from the top of the frame and arching over the nose in front thereof and thence extending vertically downward to engage the forwardly-curved horizontal section of the frame, an outer frame of contour similar to the inner frame and suitably held thereover and spaced apart therefrom, a section of reticulated material carried by said outer frame and of approximately the same conformation as the inner section, the two sections of reticulated material being spaced apart from each other to form an intervening space, means for detachably connecting said frames together, a mass of air-filtering material filling said space and a section of flexible material secured to the horizontal part of the inner frame and adapted to extend underneath the chin of the wearer.

6. In a respirator, a frame fitting the face and inclosing the nose and mouth of the wearer, and a flexible apron carried at the lower end of said frame to coöperate therewith, said apron having its inner edge gathered and provided with an elastic puckering-string to cause said apron to fit snugly around the chin of the wearer.

7. In a respirator, a frame adapted to entirely inclose the face of the wearer around the nose and mouth, said frame comprising an upper non-flexible part or frame proper for the upper part of the face and a lower flexible portion secured thereto for the lower parts of the face, said flexible part being adapted to extend underneath and inclose the chin of the wearer, the upper portion having the part thereof engaging the face provided with a non-resilient bendable metallic border to adapt the upper part of the frame to be readily bent to fit the face of the wearer, the lower flexible portion being gathered at its inner edge and provided with an elastic puckering-string to fit underneath the chin to permit the same to move in a natural manner.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. GILFORD GATES.

Witnesses:

T. J. TODD,

JOSEPH S. BROWN.