

Specification of Samuel Barton : face shield for respiring in noxious atmospheres.

Contributors

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A.D. 1872, 10th August. N° 2393.

SPECIFICATION

OF

SAMUEL BARTON.

FACE SHIELD FOR RESPIRING IN
NOXIOUS ATMOSPHERES.

LONDON:

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1873.





A.D. 1872, 10th August. N^o 2393.

Face Shield for Respiring in Noxious Atmospheres.

LETTERS PATENT to Samuel Barton, of Cannon Street, in the City of London, for the Invention of "IMPROVEMENTS IN APPARATUS FOR PROTECTING THE FACE AND HEAD, AND PERMITTING RESPIRATION IN PLACES WHERE THE ATMOSPHERE IS CHARGED WITH NOXIOUS GASES OR VAPOURS, SMOKE, OR OTHER IMPURITIES."

Sealed the 24th December 1872, and dated the 10th August 1872.

PROVISIONAL SPECIFICATION left by the said Samuel Barton at the Office of the Commissioners of Patents, with his Petition, on the 10th August 1872.

I, SAMUEL BARTON, of Cannon Street, in the City of London, do hereby declare the nature of the said Invention for "IMPROVEMENTS IN APPARATUS FOR PROTECTING THE FACE AND HEAD, AND PERMITTING RESPIRATION IN PLACES WHERE THE ATMOSPHERE IS CHARGED WITH NOXIOUS GASES OR VAPOURS, SMOKE, OR OTHER IMPURITIES," to be as follows:—

My Invention relates to apparatus which when properly fitted and secured upon the head of any person will permit the wearer to enter and

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remain with perfect safety in rooms or other places wherein the atmosphere is charged with noxious gases or vapours, smoke, or other impurities.

The said apparatus is constructed as follows:—A cover or shield is properly shaped to enclose the nose and mouth and the adjacent parts of 5 the face. The said cover is preferably made of soft metal, so that it may be readily adapted to the contour of any face upon which it may be worn. To the edges of this cover I attach a tubular pad of vulcanized india-rubber filled with water. The said metal cover is attached to a hood which is formed to be drawn over the head and to fit closely the 10 head, face, and neck. The said hood is preferably made of some textile material, rendered impervious to air and gas by being coated with india-rubber. The front of the hood is provided with eye pieces or goggles of glass, which enable the wearer to see clearly while protecting his eyes from the heated air or gas. The eyes are further protected by tubular 15 pads of vulcanized india-rubber filled with water and fixed on the inner side of the hood in a position to bear upon the upper part of the cheeks. The ends of these pads meet the pad placed around the aforesaid face cover, and thus an air-tight joint is formed all around the eyes.

For properly securing the cover and hood upon the head of the wearer 20 I use straps of leather or other suitable material. One of these straps is attached to the upper front part of the hood, just above the goggles, and passes over the head to the back of the hood; it is secured by a loop at the back of the hood and its end is provided with a loop. A second strap is passed through this loop around the front of the metal cover and 25 is secured by a buckle. By tightening this strap the other strap is also drawn tight, so that only one buckle will be required. The part of the hood which covers the top of the head and neck should be made of thinner material than the front part thereof. And at the bottom the said hood is provided with a string or band whereby it may be drawn tight around 30 the neck.

The aforesaid metal cover is provided with a three-way tap with valves, so arranged that the passage to the outer surrounding atmosphere may be opened or closed when desired.

If the above described apparatus is to be used in connection with a 35 bag or reservoir of pure air carried at the back of the wearer, I apply

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tubes of vulcanized india-rubber or other flexible material to the inlet and outlet apertures, to connect the same with the air bag, and the air is drawn therefrom through the inlet valve into the lungs and returned through the outlet tube into the said bag. But as the air expelled from
5 the lungs will be charged with carbonic acid gas I attach to the said apparatus a filter containing in layers granulated quicklime, charcoal, and cotton wool or other fibrous substance saturated with glycerine or other fatty material. The air expelled from the lungs in returning to the reservoir must pass through these filtering materials which will
10 remove and absorb the carbonic acid and any organic impurities with which it may be charged. By this contrivance the same quantity of air may be breathed a great number of times.

Instead of having the said apparatus connected with a portable air reservoir or bag, as above described, the inlet valve may be connected by
15 a flexible tube to a fixed reservoir, supplied with air by a pump or other suitable forcing apparatus; or the said inlet valve may be connected by a tube directly with an air pump. Or in some instances I may use a flexible pipe or tube long enough to extend beyond the vitiated atmosphere in which the apparatus is used and opening into any space filled
20 with pure air. With any of these last-mentioned arrangements the air is drawn through the tubes or pipes from the source of supply, and is expelled through the outlet valve into the surrounding atmosphere.

Instead of being provided with any of the above contrivances for
25 ensuring a supply of pure air, the said apparatus may have the face cover provided with a filter, which permits the supply of air to be drawn directly from the surrounding atmosphere. This filter is filled with alternate layers of various absorbent materials.

The said filter, which is fixed upon the metal face cover, is preferably
30 constructed as follows:—The aforesaid absorbent materials are placed in a cylinder made of tin or other thin metal, with ends of woven wire or perforated sheet metal. This cylinder is enclosed within another cylinder, which is secured to the aforesaid metal face cover and has a screw cap at one end for retaining the inner cylinder in place, the said
35 cap being formed of woven wire or perforated metal. A space is left at the other end between the inner and outer cylinders, and from this space

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a passage extends to the inlet valve. The outlet valve is placed in a convenient position at one side of the face cover. The air is drawn through the filter and inlet valve into the lungs, and expelled through the outlet valve into the surrounding atmosphere.

When the apparatus is to be used in an atmosphere charged with 5
smoke or dense impurities, I prefer that the aforesaid filter should contain layers of granulated charcoal arranged alternately with cotton wool or other fibrous material saturated with glycerine. When the atmosphere is charged with carbonic acid the filter should contain granulated quicklime in addition to the above substances. 10

In some cases the metal face cover may be used without the hood or the covering for the eyes, the said face cover being secured by straps, as above described, or by other suitable means.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Samuel Barton in the Great Seal Patent Office 15
on the 10th February 1873.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, SAMUEL BARTON, of Cannon Street, in the City of London, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Tenth day of August, in the year of 20
our Lord One thousand eight hundred and seventy-three, in the thirty-sixth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Samuel Barton, Her special licence that I, the said Samuel Barton, my executors, administrators, and assigns, or such others as I, the said Samuel Barton, my executors, administrators, 25
and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "**IMPROVEMENTS IN APPARATUS FOR PRO- 30**
TECTING THE FACE AND HEAD, AND PERMITTING RESPIRATION IN PLACES WHERE THE ATMOSPHERE IS CHARGED WITH NOXIOUS GASES OR VAPOURS, SMOKE, OR OTHER IMPURITIES," upon the condition (amongst others) that I, the said Samuel

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Barton, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Samuel Barton, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the accompanying Drawing, forming a part of this Specification :—

My Invention relates to apparatus which when properly fitted and secured upon the head of any person will permit the wearer to enter and remain with perfect safety in rooms or other places wherein the atmosphere is charged with noxious gases, or vapours, or smoke.

The manner in which the said apparatus is constructed and used is fully explained in the following description and accompanying Drawing.

DESCRIPTION OF THE DRAWING.

Figure 1 is a perspective view illustrating the manner of wearing my improved apparatus.

Figure 2 shews detached portions of the same.

Figure 3 is a perspective view, shewing a modified form of the said apparatus.

Figure 4 is an inside view of the respirator shown in Figure 3.

Figure 5 is a vertical section on the line *x, x*, Figure 4.

Figure 6 shews the metal face piece of the said apparatus detached.

Figure 7 is a horizontal section of the said face piece with a filter herein-after described.

Like letters indicate the same parts throughout the Drawing.

a is a cover or shield properly shaped to enclose the nose and mouth, and the adjacent parts of the face. The said cover is preferably made of

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soft metal, so that it may be readily adapted to the contour of any face upon which it may be worn. To the edges of this cover I attach a tubular pad *b* of vulcanized india-rubber filled with water. The said metal cover is attached to a hood *c*, which is formed to be drawn over the head and to fit closely the head, face, and neck, as shewn in Figures 1 and 3. The said hood is preferably made of some textile material, rendered impervious to air and gas by being coated with vulcanized india-rubber. The front of the hood is provided with eye pieces or goggles *d* of glass, which enable the wearer to see clearly while protecting his eyes from the heated air or gas. The eyes are further protected by a tubular pad *e* of vulcanized india-rubber filled with water and fixed on the inner side of the hood in a position to bear upon the forehead and upper part of the cheeks. The ends of this pad meet the pad *b* placed around the aforesaid face cover, as shown in Figure 4, and thus an airtight joint is formed all around the eyes.

For properly securing the cover and hood upon the head of the wearer I use straps *f*, *f*¹, of leather or other suitable material. One of these straps *f* is attached to the upper front part of the hood *c* just above the goggles *d*, and passes over the head to the back of the hood; it is secured by a loop at the back of the hood, and its end is provided with a loop; the second strap *f*¹ is passed through this loop around the front of the metal cover and is secured by a buckle, as shewn. By tightening this strap *f*¹ the other strap *f* is also drawn tight, so that only one buckle will be required. The part *c*¹ of the hood *c* which covers the top of the head and neck should be made of thinner material than the front part thereof. And at the bottom the said hood is provided with a string or band whereby it may be drawn tight around the neck, or the hood may be confined by the collar of the coat.

The aforesaid metal cover *a* is provided with a three-way tap *g* with valves so arranged that the passage to the outer surrounding atmosphere may be opened or closed when desired.

If the above-described apparatus is to be used in connection with a bag or reservoir *h* of fresh air carried at the back of the wearer, as shewn in Figure 3, I apply tubes *h*¹, *h*², of vulcanized india-rubber or other flexible material to the inlet and outlet apertures to connect the same with the air bag *h*, and the air is drawn therefrom through the inlet valve *h*¹ into

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the lungs and returned through the outlet tube h^2 into the said bag. These tubes are preferably corrugated, as shewn, to prevent their liability to collapsing or being accidentally closed when the apparatus is in use.

- 5 As the air expelled from the lungs will be charged with carbonic acid gas I attach to the said apparatus a filter i containing in layers granulated quicklime, charcoal, and cotton wool or other fibrous material saturated with glycerine or other fatty matter. The air expelled from the lungs in returning to the reservoir h must pass through these
10 filtering materials, which will remove and absorb the carbonic acid and any organic impurities with which it may be charged. By this contrivance the same quantity of air may be breathed a great number of times.

- Instead of having the said apparatus connected with a portable air
15 reservoir or bag, as above described, the inlet valve h^1 may be connected by a flexible tube to a fixed reservoir, supplied with air by a pump or other suitable forcing apparatus, or the said inlet valve may be connected by a tube directly with an air pump. Or in some instances I may use a flexible pipe or tube long enough to extend beyond the vitiated atmo-
20 sphere in which the apparatus is used, and opening into any space filled with pure air. With either of these last-mentioned arrangements the air is driven through the tubes or pipes from the source of supply, and is expelled through the outlet valve into the surrounding atmosphere.

- Instead of being provided with any of the above contrivances for
25 ensuring a supply of pure air the said apparatus may have the face cover provided with a filter, which permits the supply of air to be drawn directly from the surrounding atmosphere, as shewn in Figures 3, 4, 5, 6, 7. The said filter is filled with alternate layers of various absorbent materials.

- 30 The said filter, which is fixed upon the metal face cover, is preferably constructed as follows:—The aforesaid absorbent materials are placed in a cylinder j made of tin or other thin metal with ends j^1 of woven wire or perforated sheet metal. This cylinder is enclosed within another cylinder k , which is secured to the aforesaid metal face cover and has a
35 screw cap l at one end for retaining the inner cylinder in place, the said cap being formed of brass or other suitable metal. A space m is left at

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the other end between the inner and outer cylinders *j*, *k*, as shewn in Figure 5, and from this space a passage extends to the inlet valve *h*¹. The outlet valve *h*² is placed in a convenient position at one side of the face cover.

The air is drawn through the filter and inlet valve into the lungs, and 5 expelled through the outlet valve into the surrounding atmosphere. Figure 5 also shews the said inner cylinder placed excentrically within the outer cylinder, for the purpose of giving as large a space as possible between the two cylinders for the passage of the air, but if desired the two cylinders may be concentric with each other, as shown in 10 Figure 7.

When the apparatus is to be used in an atmosphere charged with smoke or dense impurities, I prefer that the aforesaid filter should contain layers of granulated charcoal arranged alternately with cotton wool or other fibrous material saturated with glycerine. When the atmosphere 15 is charged with carbonic acid the filter should contain granulated quicklime in addition to the above substances.

In some cases the metal face cover may be used without the hood or the covering for the eyes, the said face cover being secured by straps, as above described, or by other suitable means. 20

Having thus fully described my said Invention and the manner of performing the same, I wish it understood that I claim,—

First. The metal face piece constructed as herein described, and provided with a hood and with the vulcanized india-rubber water pads, for the purposes specified. 25

Second. The said face piece provided with glass eye pieces or goggles and with the vulcanized india-rubber water pad surrounding the same, for the purposes specified.

Third. The straps for securing the hood, arranged in combination with each other, as herein set forth and for the purpose specified. 30

Fourth. The filter, constructed and packed as herein described, in combination with the said face piece, and with suitable valves and other appliances, as herein set forth and for the purposes specified.

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Fifth. The combination of the said face piece with a metal tube and flexible tube to permit the wearer of the said face piece to obtain air from a distance, as herein specified.

Sixth. The face piece, the filter, and the bag or reservoir arranged in
5 combination with each other and with the valves and flexible pipes, as herein set forth and for the purposes specified.

In witness whereof, I, the said Samuel Barton, have hereunto set my hand and seal, this Tenth day of February, in the year of our Lord One thousand eight hundred and seventy-three.

10

SAMUEL BARTON. (L.S.)

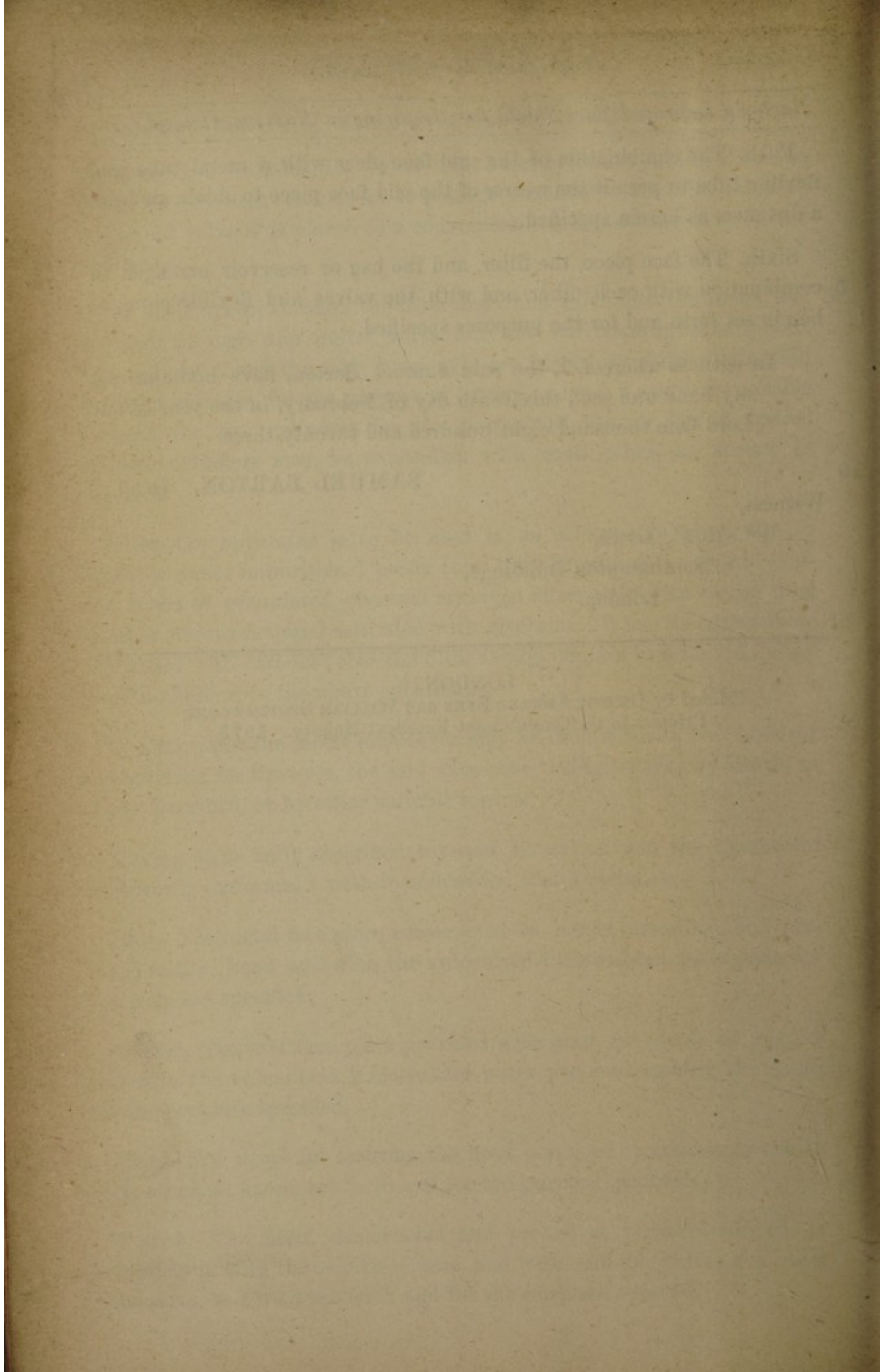
Witness,

W^M. ROB^T. LAKE,

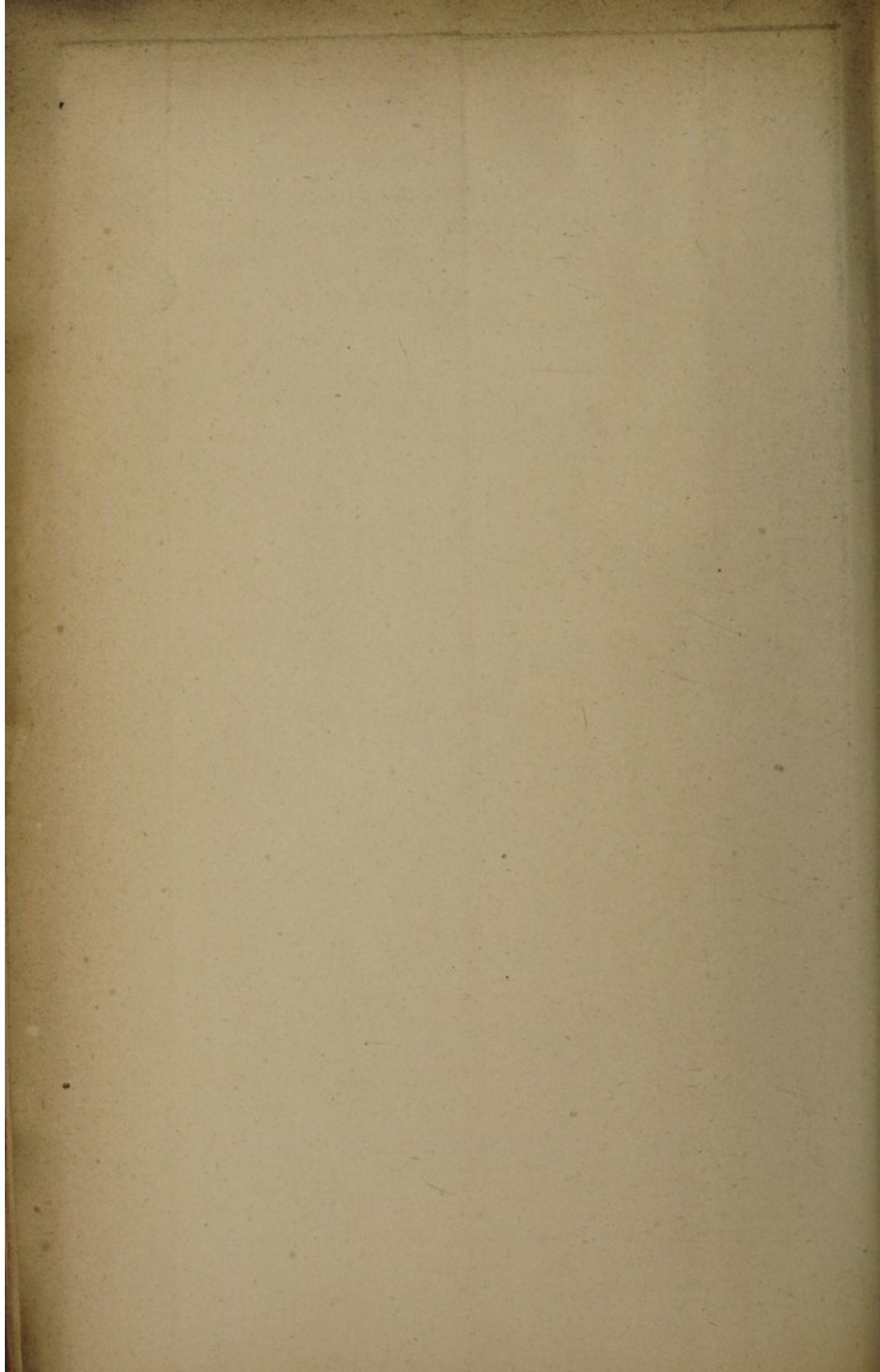
8, Southampton Buildings,

London.

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Printers to the Queen's most Excellent Majesty. 1873.







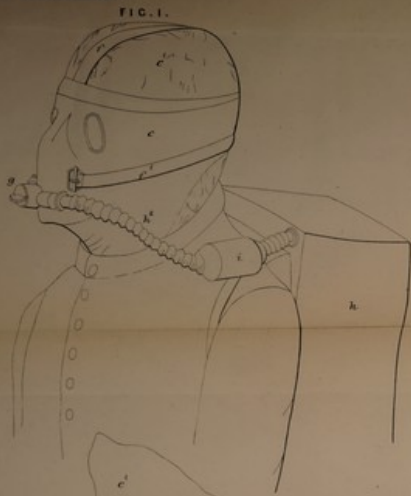


FIG. 1.

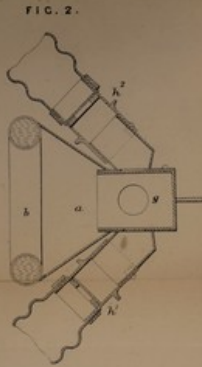


FIG. 2.

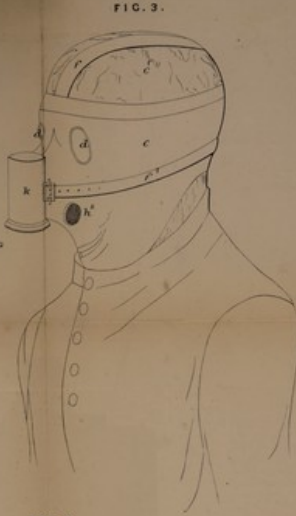


FIG. 3.

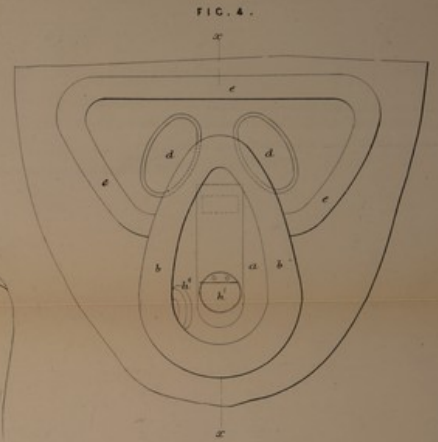


FIG. 4.

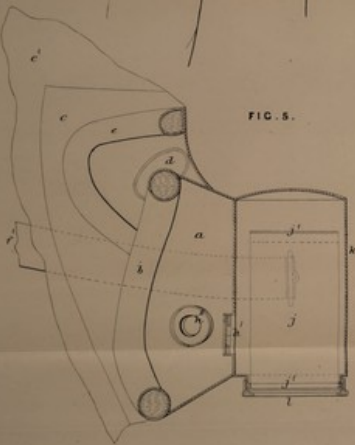


FIG. 5.

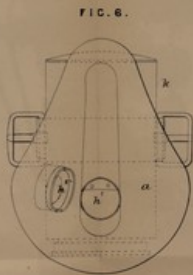


FIG. 6.

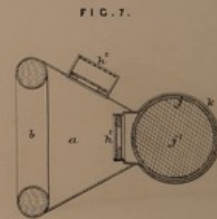


FIG. 7.

