Specification of George Davies : respiratory apparatus.

Contributors

Davies, George.

Publication/Creation

London : Great Seal Patent Office, 1864 (London : George E. Eyre and William Spottiswoode)

Persistent URL

https://wellcomecollection.org/works/w7vzu28e

License and attribution

This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

wellcome collection

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

25

A.D. 1864, 18th April. N° 974.

SPECIFICATION

OF

GEORGE DAVIES.

RESPIRATORY APPARATUS.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:
PUBLISHED AT THE GREAT SEAL PATENT OFFICE,
25, SOUTHAMPTON BUILDINGS, HOLBORN.

Price 8d.

1864.

A.D. 1864, 18th April. N° 974.

Respiratory Apparatus.

LETTERS PATENT to George Davies, of No. 1, Serle Street, Lincoln's Inn, in the County of Middlesex, and No. 28, Saint Enoch Square, in the City of Glasgow, Civil Engineer and Patent Agent, for the Invention of "An Improved Respiratory Apparatus."—A communication from abroad by Albert Galibert, of Paris.

Sealed the 13th October 1864, and dated the 18th April 1864.

PROVISIONAL SPECIFICATION left by the said George Davies at the Office of the Commissioners of Patents, with his Petition, on the 18th April 1864.

I, George Davies, of No. 1, Serle Street, Lincoln's Inn, in the County of Middlesex, and No. 28, Saint Enoch Square, in the City of Glasgow, Civil Engineer and Patent Agent, do hereby declare the nature of the said Invention for "An Improved Respiratory Apparatus," (a communication to me from abroad by Albert Galibert, of Paris,) to be as follows:—

A respiratory apparatus which would allow of a prolonged stay in liquids or in deleterious gases has long been sought, and different ingenious systems have been devised, but they are for the most part complicated and expensive, and only act mechanically by the aid of auxiliaries, and in no case allow of a direct communication between the atmospheric air and the lungs of the operator.

In order to remedy these various defects, the Inventor has devised an apparatus which is of extreme simplicity, very moderate expense, without any mechanism, and capable of being used by any one without any assistance.

The apparatus is composed, firstly, of a small piece of wood or ivory having

the form and dimensions of the human mouth when open, and pierced with with two holes. Secondly, of two india-rubber tubes, which are affixed to this mouth-piece, so that each tube corresponds with one of the holes, the other end of the tubes communicates with the pure atmospheric air. The length of these tubes is determined by the conditions under which the apparatus is to be used. Thirdly, of a nose-clip, intended to prevent the introduction of any liquid or gases into the nasal passages.

The manner of using this apparatus is as follows:—The operator compresses the nose by applying the clip, and then inserts the mouth-piece into his mouth, holding it lightly with the teeth, he then closes one of the openings with his tongue, and commences to draw breath through the other, prolonging the inspiration as long as possible. He then carries the tongue to the latter, and breathes out or exhales through the former, and so on alternately. A few minutes practice will suffice to cause any person unaccustomed to the apparatus to move his tongue instinctively from one hole to the other and back again alternately as required.

When it is required to use this apparatus in such situations where pure atmospheric air cannot be reached without having tubes of inordinate length, it is preferable to use an air reservoir (made of the entire skin of a goat, for instance,) fastened by straps or otherwise to the back of the operator, one of the aforesaid tubes communicating with the upper part, and the other with the lower part of the reservoir; the latter serves for the inspiration of pure air into the lungs from the lower part of the reservoir, and the former for the expiration of the vitiated air back into the upper part of the same. The reservoir is filled with pure atmospheric air when required by means of bellows, and will contain a sufficient quantity of air to last a man for about half an hour.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said George Davies in the Great Seal Patent Office on the 18th October 1864.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, George Davies, of No. 1, Serle Street, Lincoln's Inn, in the County of Middlesex, and No. 28, Saint Enoch Square, in the City of Glasgow, Civil Engineer and Patent Agent, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Eighteenth day of April, in the year of our Lord One thousand eight hundred and sixty-four, in the 27th year of Her

reign, did, for Herself, Her heirs and successors, give and grant unto me, the said George Davies, Her special license that I, the said George Davies, my executors, administrators, and assigns, or such others as I, the said George Davies, my executors, administrators, or 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 "AN IMPROVED RESPIRATORY APPARATUS," (being a communication to me from abroad by Albert Galibert, of Paris,) upon the condition (amongst others) that I, the said George Davies, my executors or administrators, by an instrument in writing under my hand and seal, or under the hand and seal of one of them, 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 George Davies, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement in writing, and on reference being had to the accompanying Sheet of Drawings, that is to say:—

A respiratory apparatus which would allow of a prolonged stay in liquids or in deleterious gases has long been sought, and different ingenious systems have been devised, but they are for the most part complicated and expensive, and only act mechanically by the aid of auxiliaries, and in no case allow of a direct communication between the atmospheric air and the lungs of the operator.

In order to remedy these various defects the Inventor has devised an apparatus which is of extreme simplicity, very moderate expense, without any mechanism, and capable of being used by any one without any assistance.

The apparatus is composed, firstly, of a small piece of wood or ivory having the form and dimensions of the human mouth when open, and pierced with two holes. Secondly, of two india-rubber tubes, which are affixed to this mouth-piece, so that each tube corresponds with one of the holes; the other end of the tubes communicates with the pure atmospheric air. The length of these tubes is determined by the conditions under which the apparatus is to be used. Thirdly, of a nose-clip, intended to prevent the introduction of any liquid or gases into the nasal passages.

The uses which may be made of this respiratory apparatus are very numerous, the principal of which may be enumerated as follows :—

Firstly, as an apparatus permitting of the extinction of fires at their beginning, as it is very portable, and a quarter of a minute suffices to adjust the same. Numerous experiments have demonstrated that a person can stay without danger a very long time in the most intense smoke, and in a very high temperature.

Secondly, for marine purposes, beside the use that could be made of it in case of fire, it will be useful in the stopping of leaks and exterior repairs.

Thirdly, for descending into wine or beer vats, or other similar vessels.

Fourthly, as an apparatus for the diver, well sinker, miner, or other similar purposes.

Fifthly, for entering and staying without danger in places charged with deleterious gases, especially that used for lighting purposes.

Sixthly, for carrying on without danger to the health of the workmen such trades or occupations as are unhealthy or dangerous.

Seventhly, for entering and staying without danger any required length of time in the suffocating gas of cesspools.

Eighthly, for taking ordinary or medicinal baths, because it permits a complete immersion during the whole time of the bath, which exercises thus an equal temperature and an equal pressure on all parts of the body.

Vapor baths also will be rendered more efficacious by its employment, because the patient being able to breathe the external atmosphere, the body can support a much higher temperature.

Such being the nature and object of the said Invention for "An Improved Respiratory Apparatus," I will now proceed to describe more in detail the manner in which the same is to be or may be performed or carried into practical effect, and in order that the same may be distinctly understood I have annexed hereunto a Sheet of Drawings illustrative thereof, and have marked the same with figures and letters of reference corresponding with those in the following explanation thereof, that is to say :—

In the annexed Drawing Figures 1, 2, and 3 represent longitudinal and transverse sections and plan view of the mouth-piece A ; this piece, which is made of wood, bone, or ivory, is provided with two tubular projections a and a^1, to which are adapted the india-rubber tubes c and c^1, of a length determined by the application which it is proposed to make of the apparatus. The tube c, for example, serves for inspiration, and the tube c^1 for expiration ; they communicate, both of them, with respirable atmospheric air.

The manner of using this apparatus is as follows:—The operator compresses

the nose by applying the clip *p* (see Figure 9), and then inserts the mouth-piece A into his mouth, holding it lightly with the teeth, he then closes one of the openings (*a*, for example,) with his tongue, and commences to draw breath through the other (or a^1), prolonging the inspiration as long as possible. He then carries the tongue to the latter, and breathes out, or exhales through the former, and so on alternately. A few minutes practice will suffice to cause any person unaccustomed to the apparatus to move his tongue instinctively from one hole to the other and back again alternately as required.

When the apparatus has not been used for some time the operator should take care to blow forcibly through both tubes, in order to drive out any dust or other foreign body that may have been introduced therein.

For certain works (those carried on in excavations, for instance,) where a slip of earth might flatten one of the tubes, and paralyze the employment of the respiratory apparatus, I replace the india-rubber tubes by tubes c^1 of the same material, but furnished with an interior coil of wire *r*, as shown in Figure 8. These tubes will support and resist a great pressure without risk of deterioration, and as they are only made of a certain length, they are to be united by means of metallic sockets without weakening the tubes,

When it is required to descend into wells of great depth, or into mines, or to use this apparatus in such situations where pure atmospheric air cannot be reached without having tubes of inordinate length, it is preferable to use an air reservoir, (made of the entire skin of a goat, for instance,) fastened by straps or otherwise to the back of the operator, (as shewn at Figures 4, 5, and 9,) one of the aforesaid tubes communicating with the upper part, and the other with the lower part of the reservoir; the latter serves for the inspiration of pure air into the lungs from the lower part of the reservoir, and the former for the expiration of the vitiated air back into the upper part of the same. The reservoir is filled with pure atmospheric air when required by means of bellows, and will contain a sufficient quantity of air to last a man for about half an hour. Figure 4 shows a longitudinal section of a leather vessel made of the skin of a goat, to which are adapted suspending straps; and Figure 5 is a longitudinal section of the same. The leather vessel or bottle B is prepared in the same manner as those used in certain countries to contain oil or wine, and has connected to it by the two fore feet the india-rubber tubes *c*, c^1, which are united at their other ends to the mouth-piece A, above described. The tube *c*, which corresponds to the inspiration aperture *a*, descends when the vessel is filled with air to within a short distance of the

bottom of the latter, whilst the tube c^1 suspended by a cord is kept at the upper part thereof. The straps D and D^1 serve for carrying the vessel on the shoulders, and the waist belt C confines it to the body, as shown at Figure 9.

The vessel (as above stated) contains quite as much air as would be required to last for about half an hour's work, a sufficiently long time for any work or examination to be effected in places filled with pestilential or suffocating gases or vapors. The workman inhales and exhales in the same manner as when breathing the external atmosphere, he is free in all his movements, and can easily handle his tools or implements without any more fatigue than when at ordinary work. If it should happen when descending into a dark well or other place that the lamp cannot be kept alight for want of air, a small branch tube from the vessel may be connected to the lamp, which will thus be supplied with air as long as the workman is required to stay. The small quantity of air absorbed by the lamp will only reduce by a very insignificant fraction the time which the air will last. To keep the leathern vessel B perfectly air-tight (which is absolutely necessary for assuring the success of the apparatus), the skin must not be pierced, but at those places where it is desired to connect the straps a small round piece of wood, grooved on the circumference like a pulley (as shown at H, Figure 6,) must be introduced into the vessel, and the skin is to be tied tightly over it by a cord or ligature *h* passing round the groove, and the straps or other appurtenances are then to be screwed, or otherwise fixed to the pieces of wood H. The extremities of the legs, the neck, and the tail are furnished with similar pieces of wood covered with an impermeable varnish. To fill the skin or vessel a pair of bellows S (see Figure 7) is to be employed, being actuated by the two hands, which are passed through the straps *s*, s^1. The mouth-piece A (from which the tubes *c* and c^1 communicate with the interior of the skin or vessel) is for this purpose introduced into the conical piece *t*, which forms a part of the body of the bellows. A few minutes suffice for filling the vessel entirely, and it may be kept full by pinching the tubes *c* and c^1, so as to close all communication with the external atmosphere.

Having now particularly described the nature and object of the said Invention for "An Improved Respiratory Apparatus," together with the manner in which the same is to be or may be performed or carried into practical effect, I would remark, in conclusion, that I claim as the Invention (communicated to me by the above-named Albert Galibert), the respiratory apparatus above described and illustrated in the annexed Drawings, whether the same is employed with simple tubes communicating with the atmospheric air or with

a reservoir of air, for descending into places where a great length of tubes would be an obstacle.

In witness whereof, I, the said George Davies, have hereunto set my hand and seal, this Eighteenth day of October, in the year of our Lord One thousand eight hundred and sixty-four.

GEORGE DAVIES. (L.S.)

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1864.

A.D. 1864. April 18. Nº974.
DAVIES' Specification.

(1 SHEET)

FIG. 1.

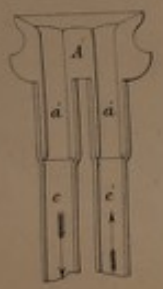


FIG. 3.

FIG. 2.

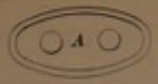


FIG. 4.

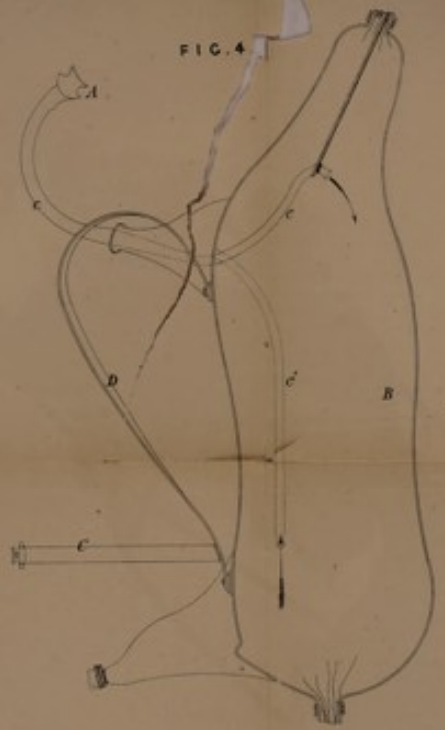


FIG. 9.

FIG. 7.

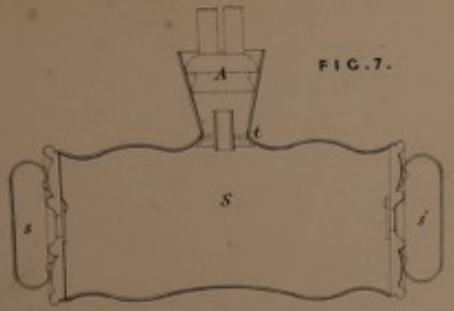


FIG. 5.

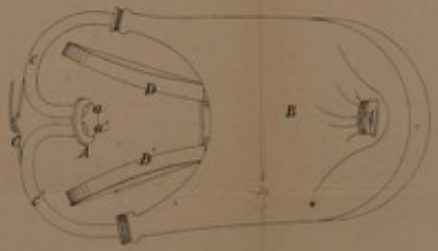
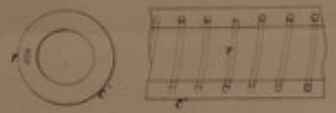


FIG. 6.

FIG. 8.



The filed drawing is partly colored.

Drawn on Stone by Malby & Sons.

London: Printed by George Edward [illegible] and William Spottiswoode,
Printers to the Queens most [illegible] Majesty. 1864.