(No Model.) 2 Sheets—Sheet 1.

C. F. DIGHT.

THERMAL INSPIRATOR.

No. 603,021. Patented Apr. 26, 1898.

Fig. 2.

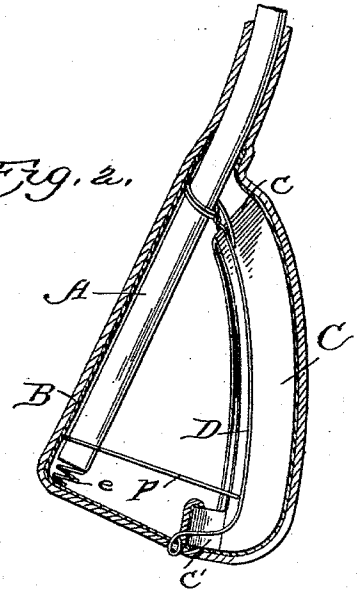


Fig. 1.

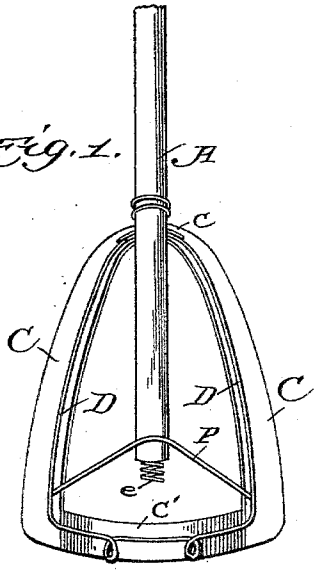


Fig. 3.

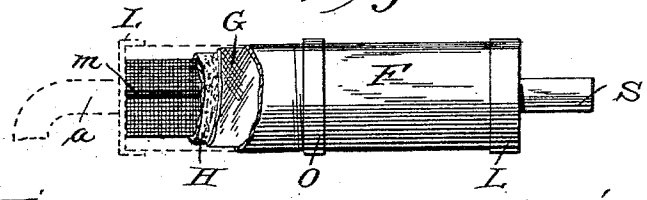


Fig. 4.

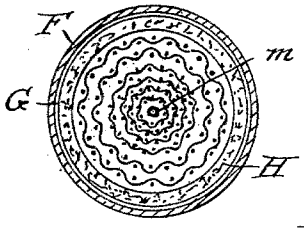


Fig. 5.

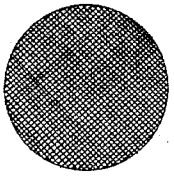


Fig. 6.

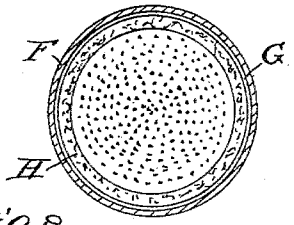


Fig. 7.

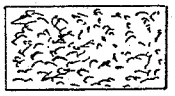


Fig. 8.

Attest

C. S. Middleton

Wm. F. Hall

Inventor

Charles Fremont Dight

(No Model.) 2 Sheets—Sheet 2.

C. F. DIGHT.

THERMAL INSPIRATOR.

No. 603,021. Patented Apr. 26, 1898.

Fig. 12.

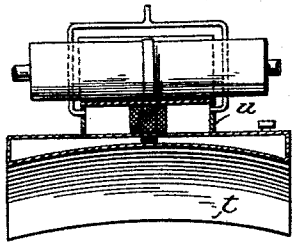


Fig. 9.

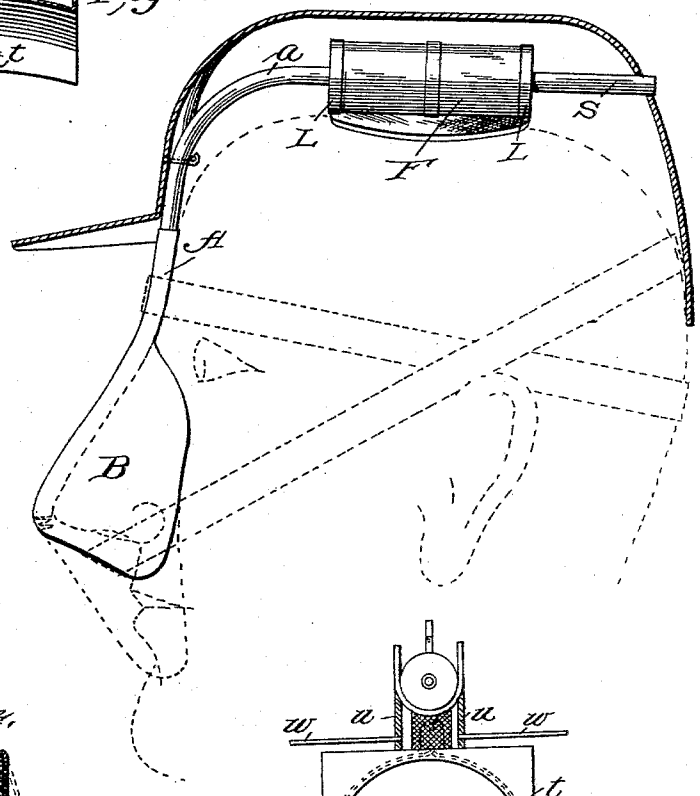


Fig. 10

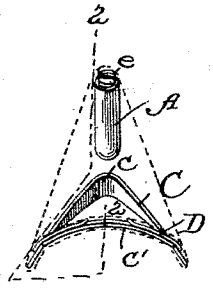


Fig. 14.

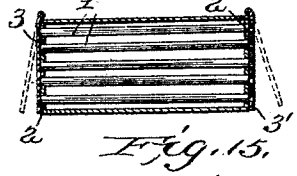


Fig. 13.

Fig. 15.

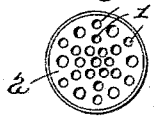


Fig. 16.

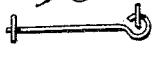
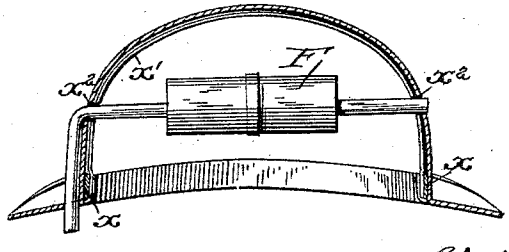


Fig. 11.



Attest
C. S. Middleton
Wm. F. Hall

Inventor
Charles Fremont Dight

UNITED STATES PATENT OFFICE.

CHARLES FREMONT DIGHT, OF WASHINGTON, DISTRICT OF COLUMBIA.

THERMAL INSPIRATOR.

SPECIFICATION forming part of Letters Patent No. 603,021, dated April 26, 1898.

Application filed October 15, 1897. Serial No. 655,349. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FREMONT DIGHT, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a certain new and useful Thermal Inspirator, of which the following is a specification.

My invention is designed to prevent the ill effects of cold air admitted to the nasal passages and lungs, as unavoidably occurs to persons exposed in a cold atmosphere or climate, and of supplying a volume of warm air to breathe, which may be moistened and filtered, if desired. The apparatus is especially adapted to store up the heat carried by the breath as it is expelled from the lungs and utilize the said heat to warm the air which is drawn into the lungs, thus maintaining a fair evenness in warmth of the air breathed regardless of external cold and of prolonging the resistance of the body against low temperature.

To this end my invention consists, essentially, of a cap adapted to cover the nostrils and to fit tightly around the edges, so as to prevent the escape or ingress of the air except through a tube which connects the space inclosed by the cap with a heat-storing chamber, through which the air is expelled and drawn in alternately.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 shows a front view with the covering of the cap removed. Fig. 2 shows a vertical longitudinal section, partly in side elevation, the covering only of the cap cut away. Fig. 3 is a side elevation, partly in section, of the heat-storing chamber. Figs. 4, 5, 6, 7, and 8 represent details of construction hereinafter more fully explained. Fig. 9 shows one form of application, support, and retention of the device. Fig. 10 is a detail view of the cap, showing the section upon which Fig. 2 is taken, giving a view of the cap from below. Fig. 11 shows a means for supporting the heat-chamber. Figs. 12 and 13 show views of auxiliary heating means for the heat-storing chamber. Figs. 14 and 15 show views of a modification, hereinafter referred to, of the heat-storing chamber. Fig. 16 is a detail view of the retaining device.

Figs. 1, 2, and 10 represent the cap designed to be placed over the nose. In these figures the cap is limited to the covering of the nostrils and nose; but, as indicated in dotted lines in Fig. 9, it may be widened and extended down over the mouth for persons compelled to breathe more or less through the mouth.

In Figs. 1 and 2, A represents a tube, preferably of rubber and of proper flexibility, which forms the air-passage between the cap and the heat-storing chamber. This tube is arranged to extend longitudinally down upon the ridge of the nose quite to or beyond the end thereof, and it forms the central front part of the framework of the cap. The sides of the cap, which extend over the sides of the nose and bear against or close to the face, are sustained by a strip of lead C. This strip is made of lead in order that it may be easily bent to conform to the shape of those parts of the face against which it bears; but any other material having like qualities may be used instead. The strip is bent over the ridge of the nose at *c* and extends down along the sides and at the end is bent inward or joined by a piece arched to lie flat across the upper lip, as shown at C in Fig. 1, so that it forms a complete frame, which may be bent to fit the surface. As indicated in the figures, the strip C lies flat against that portion of the face on which it impinges. It is strengthened, particularly along its inner border, by a piece of wire, preferably of brass, (shown at D,) which is wound around the tube A and extends down along the edge of the strip C, to which it is secured by solder or in any other convenient way. It is also carried across that part of the strip C which lies upon the upper lip and is there formed with two loops, which are made to project through the covering of the cap and are adapted to be connected with hooks for the attachment of the bands which secure the cap upon the face. In order to sustain the walls of the covering, a wire *p* extends over and is connected to the lower end of the tube A and has its outer ends connected to the lead strip. This completes the framework of the cap. Over this is stretched a covering, preferably of light rubber cloth, but any other material impervious to air may be used. This is carried around the lead strip, over which it is stitched or otherwise hermetically secured. This covering B includes the entire framework and

covers the sides and the end. The outer edge around from its junction with the tube A on one side back to said tube on the other side is caused to fit perhaps more closely than the strip does elsewhere to the face, as aforesaid, by the flexibility of the lead strip, which forms the frame on those edges. The outer covering itself may be of such a nature that it will form a practically air-tight connection with the face when the cap is drawn back against the face by the strings which attach it to the head. This will be the case if the cap is covered, as I have contemplated, with a fine fur; but I have also contemplated attaching to this edge a thin rubber tube inflated and adapted to fit against the face.

The tube A terminates at its lower end a little distance from the covering B, and a bit of the coiled spring-wire, which runs the length of the rubber tube inside of it to prevent its collapse and also to retain heat, projects therefrom at *e* and prevents the opposite part of the covering B from collapsing against the end of the tube. The upper end of the tube joins the pipe *a*, Fig. 9, which leads to the heat-storing chamber. This chamber is shown in Fig. 3. It consists, essentially, of a mass of heat-storing or good heat-conducting material, having interstices distributed and extending from end to end, thus securing a large surface of such material in a small space. It may be made of a roll of fine copper wire or aluminium, silver, or magnesium wire-gauze. This I make by winding the gauze upon a rod *m*, which may serve to connect the sections of the rolled gauze and sustain the whole. In the form shown in Fig. 3 I place outside of this roll of wire-gauze a non-conducting covering H of asbestos cloth and over this a sheet of thin copper-foil, (marked G.) The whole is closely inclosed within a case F, (air-tight or nearly so,) which may be of sections connected by a coupling O. At the ends of the case are caps L, tightly covering the ends and provided with openings for the tubular connections. To one cap is connected the outer end of the tube A by a curved pipe *a*, and to the other cap is connected a short piece of tube communicating from the interior to the open air.

The filling of the heat-retaining chamber G may be made in other ways than that described. Instead of the roll of gauze I may cut out pieces of wire-gauze, as shown in Fig. 5, and pile them in the case F, or small bits of copper may be used as filling, as illustrated in Figs. 7 and 8. The case may also be filled with longitudinal wires, as illustrated in Fig. 6. Fig. 4 shows the wound wire-gauze in end view. The heat-retaining chamber may be placed on the top of the head within the hat; but this is not an essential part of the invention, as it may be placed elsewhere. The air expelled from the lungs is forced through the tube A and through the interstices of the chamber, where it imparts its heat to the copper wire or other material adapted readily to absorb it, and is finally expelled through the open tube at the end. The drawing in of the breath reverses the current and draws the cold air through this tube (marked S) and through the mass of copper, where it is warmed, and thence through the tube *a* and A, whence it is drawn into the nostrils and lungs. The interstices should be as small as possible consistently with the freedom of breathing. The properties of the heat-storing material—copper, aluminium, silver, and some other metals which may be used, as well as the asbestos-cloth wrapping—are such as to permit of disinfection by fire, diluted acids, or other disinfectants, should that become necessary, without harm to the material. Also, the asbestos cloth is a moisture-absorbing material. Instead of the tubular covering I may use a glazing on the outer surface of the asbestos cloth, which will make it air-tight as well. I may also add a filtering material, such as cotton, at the end of the heat-absorbing material in the case.

In Figs. 14 and 15 I show modifications of the heating-chamber, in which the air is expelled and inhaled through independent tubes. These tubes 1 are fixed in heads 2 in each end of the heating-cylinder, as in the ordinary water-tube boiler. These heads 2 are also provided with openings or perforations communicating with the free air-space between said tubes 1. At each end of said heating-cylinder I provide flap-valves 3 and 3′. The valve 3′ is provided with openings adapted to aline with the tubes 1, while the valve 3 has openings alining with the openings leading to the air-space between the tubes.

The operation of this heating-chamber with its valves is as follows: As the air is expelled from the lungs in the direction from 3′ to 3 the valve 3′ will become seated and the expelled air prevented from passing into the free air-space, but will be directed through the tubes 1, the valve 3 swinging open to permit of its being discharged. On inhalation the valve 3 will be drawn onto its seat, which will close the tubes 1, but permit of the fresh air passing through the free air-space between said tubes, being warmed in its contact therewith. The valve 3′ will be forced off its seat by the incoming air, permitting this air to freely pass down through the tube A and on to the lungs.

In Fig. 11 I have illustrated a supporting device for the heat-retaining chamber which may be used in connection with hats of various styles, but which is entirely independent thereof. This consists of a flexible strip band *x*, which is adapted to lap at its ends and thereby be made adjustable and to fit, and it is held by the perspiration-band of the hat, and upon this strip is strung a band *x*′. This strip *x*′ has openings x^2 arranged diametrically therein, which may aline with similar openings in the hat proper, and through these openings the tubes leading from the heating-

cylinder pass and are supported. As shown herein, the front tube, after passing through said openings, is deflected downwardly along the crown of the hat and passes through an opening in the rim thereof. As shown, this band may be adaptable to different sizes of hats, both the band x and x' being adjustable on each other for this purpose.

In Figs. 12 and 13 an auxiliary heating means for the heating-chamber is shown. This consists of a special form of lamp-stove t, that is adapted to fit upon the head beneath the hat and which is provided with a support consisting of the inclosing walls u for the heating-chamber, which is directly above the wick v, suitable draft or air-inlet tubes w being provided, which extend through openings in the side of the hat and enter the walls which inclose the gauze and wick. The flame or burner is surrounded by a cylinder of gauze or netting v, which confines the flame, while permitting the hot air to pass out to thoroughly heat the cylinder.

Pipes lead diametrically from the upper portion of the hot-air chamber preferably out through the top of the hat to carry off all noxious odors or smoke.

I claim—

1. In combination, a cap adapted to cover the nasal passages and a chamber filled with heat-absorbing materials such as copper, a tube connecting said cap and chamber, said chamber having air-passages through it and opening to the air whereby the air may be exhaled and inhaled through said chamber, substantially as described.

2. In combination, a tube leading to a heat-storing chamber, and a lead strip connected to said tube and forming a frame on the side which bears against the face and a covering for said tube and frame, the whole forming a nasal cap, substantially as described.

3. The chamber for storing heat consisting of the heat-retaining fillings such as copper with interstices, combined with an asbestos covering and case and with a nasal cap and a connecting-tube, substantially as described.

4. In combination, the cap, the heat-storing chamber, and the devices for supporting said chamber, adapted to be included in a hat, said device consisting of a flexible band lapping at its ends, and the band x' having openings for the tubes with which it is combined, all substantially as described.

5. In combination, the cap, the storing-chamber adapted to be heated by the air exhaled and auxiliary heating means for said chamber consisting of a lamp, the inclosing walls, the gauze around the lamp-burner and the draft-tubes, all substantially as described.

6. In combination, the cap, the heat-storing chamber forming a passage for the inhaled and exhaled air and means for directing said exhaled and inhaled air through independent passages within said chamber, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES FREMONT DIGHT.

Witnesses:

HENRY E. COOPER,

R. E. OURAND.