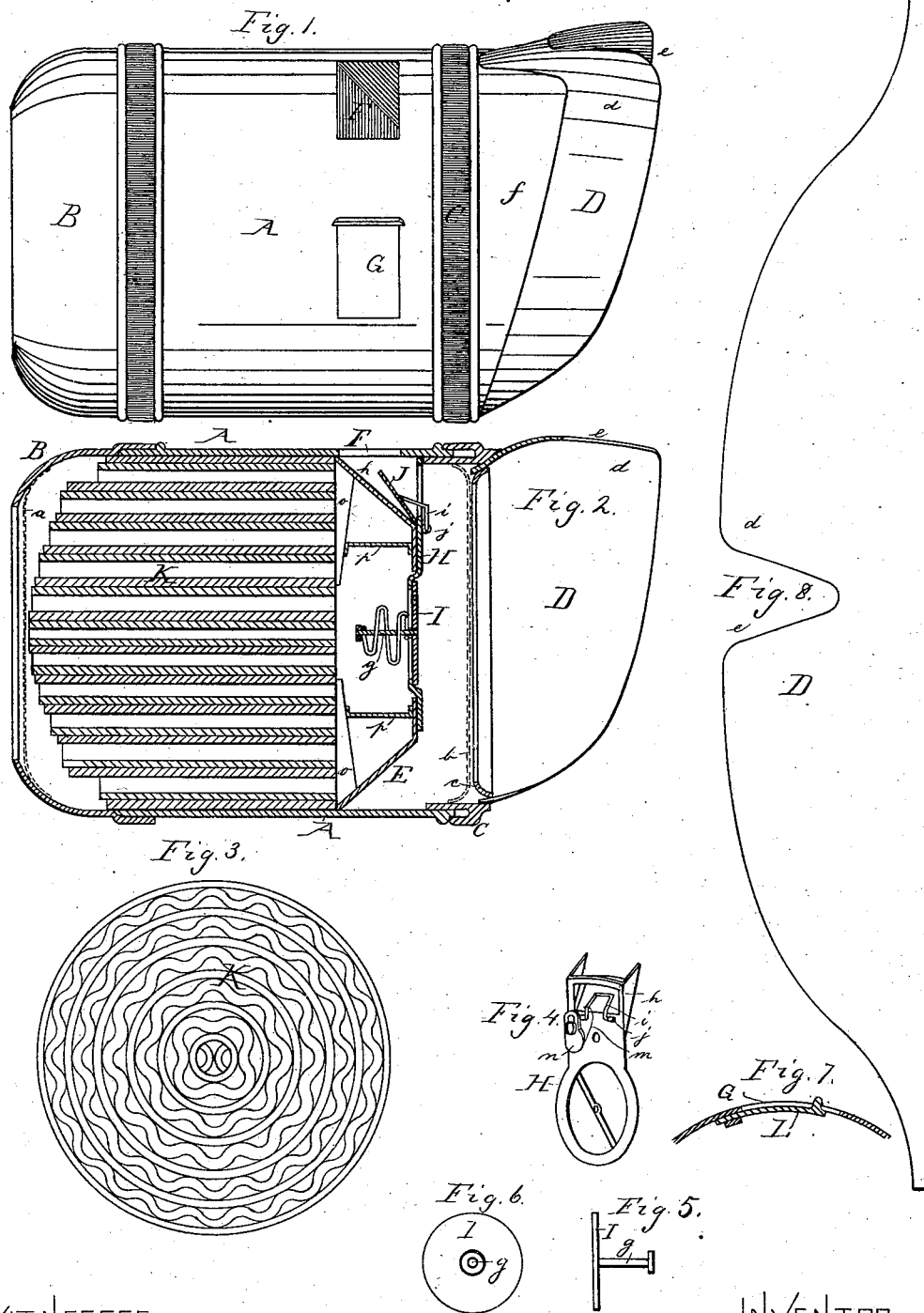


(Model.)

M. MATTER.
INHALER FOR ETHER, &c.

No. 260,403.

Patented July 4, 1882.



WITNESSES—
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INHALER FOR ETHER, &c.

SPECIFICATION forming part of Letters Patent No. 260,403, dated July 4, 1882.

Application filed December 22, 1881. (Model.)

To all whom it may concern:

Be it known that I, MARTIN MATTER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Inhalers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

The invention relates to improvements in instruments for administering ether or other fluid anæsthetics by inhalation; and it is my object to produce an instrument for that purpose that is compact and convenient in shape and size and complete in its arrangements.

Therefore my invention consists in the novel devices and combinations of devices hereinafter described and specifically claimed.

In the accompanying drawings, Figure 1 represents an elevation of my improved inhaler; Fig. 2, a longitudinal vertical section of the same; Fig. 3, an end elevation of the perforated absorbing-plug; Fig. 4, a perspective view of the valve-seat plate; Figs. 5 and 6, an edge view and plan of the circular inhaling-valve; Fig. 7, a section of the casing through the auxiliary or air-admitting opening, and Fig. 8 the rubber face-shield developed.

Like letters designate corresponding parts in all the figures.

A denotes a cylindrical casing of metal. This casing A is closed on one end by a removable convex cap, B, having a large central opening, against the inner surface of which is stretched a wire-gauze, *a*. At its opposite or front end the casing A engages with a ring, C, having an annular groove, which admits and holds the edge of the casing. This ring C forms the frame for a perforated sheet-metal diaphragm, *b*, and externally of said diaphragm this ring has attached a face-shield, D, that is made of soft vulcanized rubber, its rear edge being inserted inside the front edge of the ring C, and is rigidly clamped thereon by an internal ring, *c*. The external or front edge of this rubber face-shield is cut a peculiar shape, forming two wings, *d*, which are divided by a notch, *e*. This notch *e* fits over the bridge of the nose, while the apex of each wing that is adjacent

to such notch covers the space between the nose and cheek, and for that purpose projects about two inches from the diaphragm *b*, and thence the edges of such face-shield recede gradually toward that side of ring C which is diametrically opposite the notch *e*. This part is to cover the chin of the patient, and projects only about one-quarter of an inch from the diaphragm *b*. By this construction sufficient space is provided for the nose, and as the latter and the parts immediately adjacent are unyielding, and therefore sensitive to pressure, they come in contact with the internal surface of the face-shield only, securing thereby a very gentle and yet perfect coaptation. The outer edge of ring C has two projecting metallic wings, *f*, the shape of which corresponds somewhat with the outline of the face-shield. The object of these wings *f* is to steady the most extended parts of the face-shield, so as to cause its better coaptation to the face of the patient.

A diaphragm, E, made of sheet metal and spun out to represent in shape the frustum of a cone, is secured into casing A, near the front end of the same, with its frustum-face toward the front or face-shield D. This diaphragm E provides an annular chamber around its frustum-face, which communicates through openings F and G with the exterior atmosphere.

The diaphragm E has a circular opening in the center, and has attached by two screws a valve-seat plate, H. This plate H has a circular opening with a recessed inner edge, and a cross-bar with a central guide-hole for the disk-shaped valve I, secured to the end of a central stem, *g*, that is passed through the hole in the cross-bar, and has a head formed to its opposite extremity. A very light and sensitive spiral spring is interposed between the cross-bar and the head of the valve-stem *g*, which will permit the valve I to open in the direction for drawing air through the instrument, but will be shut by the spring immediately against draft from the opposite direction. The valve-seat plate H is radially extended at one side toward and against the inner surface of casing A, and this extension has perpendicular sides *h* of a triangular shape, which form two partitions in the annular recess that surrounds the conical diaphragm E, thus forming a chamber under such extension and be-

hind the opening F in casing A. The extended portion of this valve-seat has a square opening provided with a flap-valve, J, which swings into the chamber formed by the partitions *h*, and closes such opening from the inside. This flap-valve J is soldered to the central portion of a wire, *i*, that is bent U-shaped, and the ends of which are pivoted between two eye-lugs, *j*, which form part of the valve-seat plate H. A light spring, *m*, that holds the valve J to its seat, is adjustably secured upon the plate H by a clamp-plate, *n*, and has a loop bent to its end, which is hooked under one of the arms of the pivotal wire *i*. The air expelled by the patient will pass through valve J and the opening F in a most direct manner.

Across the base of the conical diaphragm E may be stretched a disk of fine wire-gauze; or bars *o* may be soldered against the inner edges of such diaphragm and sustained by braces *p* for supporting and holding the perforated plug K, which is removably placed between the bars *o* and cap B. This plug K, I form either of sheets of heavy unsized porous paper arranged in concentric layers, one layer having a plain cylindrical surface alternating with another layer which is crimped or corrugated, so as to produce a series of prismatic tubes for the air to pass through, as shown in Fig. 3; or I may mold such plugs of paper-pulp provided with longitudinal perforations. In either case I prefer unsized paper or pulp of paper, on account of its cheapness, while felt or other light material, which is a good absorbent, will answer my purpose just as well. The object of this plug K is to imbibe the desired quantity of the fluid anæsthetic, and then to have as large as possible a surface for evaporating it again, such vapor mixing with the air inhaled by the patient, which enters through the wire-gauze *a* in cap B, thence passes through the perforations in plug K, and through valve I and perforated diaphragm *b* inside of face-shield D. One end of plug K, I form convex to correspond with the shape of cap B, the object being to diminish the resistance of the currents of air as they pass at two curve-lines from the perforated opening in the cap B to the valve I.

The main object of the fine wire-gauze *a* is to guard against an accident by an explosion occurring when using the instrument near a light, and the perforated plate *b* is to prevent any substances that the patient may expel from his mouth from entering the interior of the instrument, and from interfering with the operation of valves I and J.

The auxiliary opening G is for admitting a limited supply of air when it is desirable to dilute the vapor admitted through valve I. This opening G is provided with a sliding gate, L, by which the air-admittance can be regulated or entirely shut off.

As will be noticed, an inhaler thus constructed will insure an operation that is positive and under perfect control of the physician or his attendant, and through which the patient will be drugged with as near as possible the exact quantity of fluid anæsthetic with which the absorbent plug K has been charged, and with quantities inhaled by each breath in proportion to the bodily condition of the patient.

I do not broadly claim the paper-tube absorbent-plug or the wire diaphragms herein described; but

What I claim is—

1. In inhalers for fluid anæsthetics, the cylindrical casing A, containing a diaphragm, E, having valve I at its center and flap-valve J near its edge, and an absorbent plug, combined with cap B, covered with wire-gauze *a*, and with ring C, having face-shield D, all substantially as and for the purpose set forth.

2. The combination, with the ring C, of the face-shield D, of soft vulcanized rubber, having wings *d* and notch *e*, the ring *c* for clamping said shield to the ring C, and the perforated sheet-metal diaphragm *b*, all constructed and arranged substantially as and for the purpose set forth.

3. In inhalers for fluid anæsthetics, the casing A, having opening F, conical diaphragm E, and valve-seat plate H, with valves I and J, all substantially as and for the purpose set forth.

4. In inhalers for fluid anæsthetics, the casing A, having opening F, conical diaphragm E, valve-seat plate H, with valves I and J, and opening G, with slide L, all substantially as and for the purpose set forth.

5. In inhalers for fluid anæsthetics, the combination of casing A, having opening F, conical diaphragm E, valve-seat plate H, with valves I and J, opening G, with slide L, cap B, having wire-gauze *a*, ring C, having perforated plate *b*, rubber face-shield D, and perforated absorbent plug K, all constructed and arranged substantially as and for the purpose described and shown.

MARTIN MATTER.

Witnesses:

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