(No Model.)

F. A. DIETRICH.

INHALER.

No. 509,465. Patented Nov. 28, 1893.

Fig. 2.

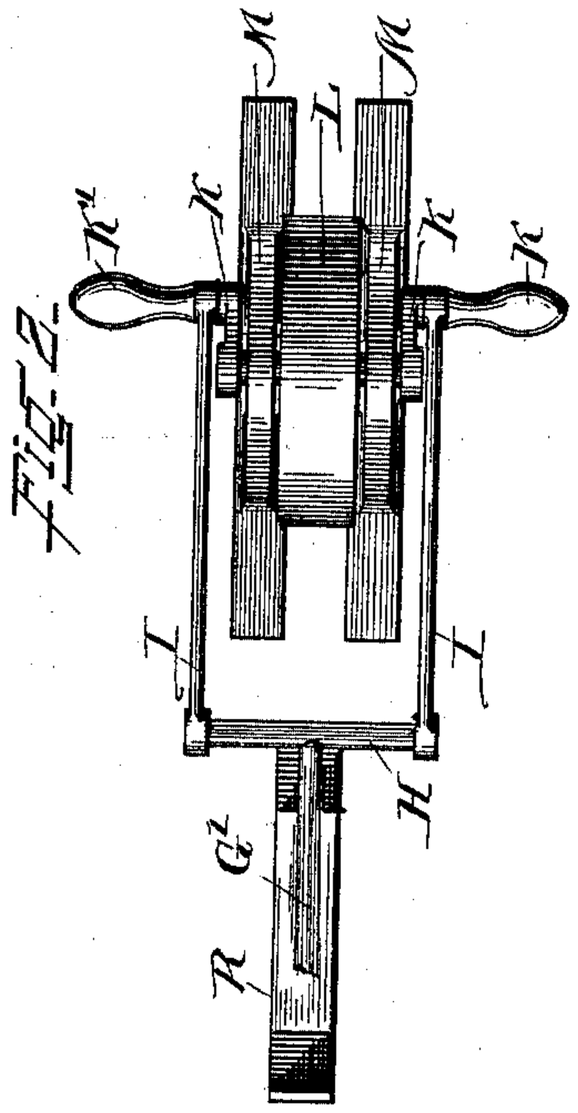

Fig. 1.

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INHALER.

SPECIFICATION forming part of Letters Patent No. 509,465, dated November 28, 1893.

Application filed December 31, 1891. Serial No. 416,695. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. DIETRICH, a citizen of the United States of America, residing at Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Inhalers, of which the following in a specification.

My invention relates to improvements in inhalers for medical purposes and particularly to inhalers of that class in which the medicinal agent is in liquid form and is atomized by a current of air, preferably supplied from a compressed air reservoir.

The invention is fully described and explained in this specification and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a complete device embodying my invention and Fig. 2 is a top plan of the driving parts of a preferred form of pump for supplying the atomizer with air.

In the views A is a reservoir for compressed air, provided with the usual safety valve, V, and having preferably a pipe, P, provided with the usual stop-cock and adapted for use in various medical and surgical operations.

B is a horizontal tube, set in the wall of the reservoir, and provided with a suitable stop-cock and B′ is a vertical tube whose lower end is within a suitable receptacle for medicine in liquid form, while its upper end is in such relation to the end of the tube B, that the two together form an atomizer adapted to draw upward the liquid in the receptacle below and convert it into a spray.

C is a horizontal tube placed in line with the small tube, B, and supported in a suitable housing, D, of sheet metal, the housing itself being supported by standard, E, and base E′. The tube, C, is provided with a terminal mouth-piece, or inhaling shield, C′, and is preferably in two pieces separable at *c*, in order that the tube may be readily removed from the housing, D, for the purpose of cleaning or packing it.

The housing, D, is formed with an opening in one of its sides for the admission of a lamp, F, and has in its top suitable perforations, *d*, for the escape of the products of combustion of the lamp.

The reservoir, A, may be supplied with air by any suitable means, but preferably by means of an air-pump, having the construction, illustrated in the drawings, in which G is a pump cylinder, resting on the base, *g*, and provided with the usual piston rod, G′, adapted to operate a piston in the ordinary manner. At the outer end of the rod, G′, is a cross-bar, H, to whose ends are pivoted the front ends of two pitmen, I, I, whose rear ends are pivoted to the free ends of cranks, K, K, fastened to the shaft of a pulley, L, the shaft being mounted in suitable bearings, M, and the ends of the cranks being provided with handles, K′. The pulley, L, has a face of such form as to receive a belt or band for transmission of power, so that the pump may be operated by suitable motor, if desired, instead of by hand. I have found it advisable in practice to provide some means for relieving the piston rod, G′, from vertical pressure which might cause it to bind or wear and for this purpose the drawings show a rest, R, which receives the downward pressure of the piston rod and of the cross-bar, H, the rest being preferably formed of a flat rod of metal bent, as shown in the drawings, and having ends, *r*, adapted to be fastened to the table on which the entire device is placed. In the machine, as I have made and used it, one of the ends, *r*, is provided with an upward extension, *r′*, fastened to the base, *g*, of the pump cylinder for the purpose of holding all the parts together, but this arrangement is, of course, not essential.

In operation the reservoir is supplied with air from the pump by the rotation of the pulley, K, the two handles, K′, permitting the use of both hands of the operator, whereby the resistance is equalized at both ends of the pulley shaft and the wear on parts of the machine is greatly lessened. The maximum pressure in the reservoir may be determined by means of a safety valve, V, and when sufficient pressure has been secured the stop-cock of the tube, B, is opened and the current of air passing outward through the tube, B, draws the medicated liquid upward through the tube, B′, and drives it outward in the fine spray through the tube, C. This spray may be inhaled by the patient from the mouth-piece, C′, and for certain purposes I intend that the device shall be used in this manner.

In diseases of the lungs and the bronchial tubes, however, the inhaling of spray is not efficacious since the spray is not carried a sufficient distance to reach the parts to be treated. In all such cases I use the lamp, F, which lies immediately under the center of the tube, C, the lamp being lighted and allowed to burn a sufficient time to thoroughly heat the tube before inhalation begins. As soon as the tube is thoroughly heated the spray passing through it is completely evaporated and reaches the mouth-piece, C′, in the form of a medicated warm air, in which no traces of moisture are discernable to the senses. This warm air or practically dry vapor penetrates the lungs and bronchial tubes at each inhalation and thus renders possible the direct application of the desired remedies to be affected surfaces of these parts.

I have found in practice that treatment by means of this inhaler gives the best possible results and that the evaporation of the spray, formed by the atomizer, is a great advantage in the use of an inhaler.

The air-pump shown and described herein, is included in this application merely as a preferred form of pump especially adapted to be used in combination with the inhaler covered by the claims hereof. It constitutes no part of the invention which I desire to secure by the Letters Patent to be issued upon the present application.

I am aware that it has been proposed to combine with an atomizer a vertical tube adapted to receive a spray from the atomizer, and a lamp placed within the lower end of the tube and adapted to vaporize the spray and carry it upward in the tube. That construction, however, involves the mingling of the products of combustion with the vapor generated from the spray. The introduction of the products of combustion of the lamp as an element of the vapor inhaled by the patient in the use of the tube, is extremely objectionable and greatly decreases the beneficial effects to be obtained from the inhalation of the vaporized medicinal elements. In the use of the device forming the subject of this application, the flame of the lamp is applied to the external surface of the inhaling tube, and the tube and its contents are heated without the admission of any of the products of combustion of the flame, so that the vapor inhaled from the tube consists entirely of pure air heated to the necessary degree and mingled in suitable proportions with the vaporized medicinal agents.

Having now described and explained my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with an atomizer and means substantially as shown and described for operating the same, of a tube adapted to receive and conduct the spray from the atomizer and a suitably supported burner adapted to apply its heat to the exterior of the tube and thereby to evaporate the spray within it; substantially as shown and described.

2. The combination with the reservoir, A, and atomizer, B, B′, of the suitably supported housing, D, the tube, C, passing through the housing and adapted to receive spray generated by the atomizer, and the lamp, F, placed within the housing and adapted to apply heat to the external surface of the tube and thereby to vaporize the spray within it; substantially as shown and described.

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