

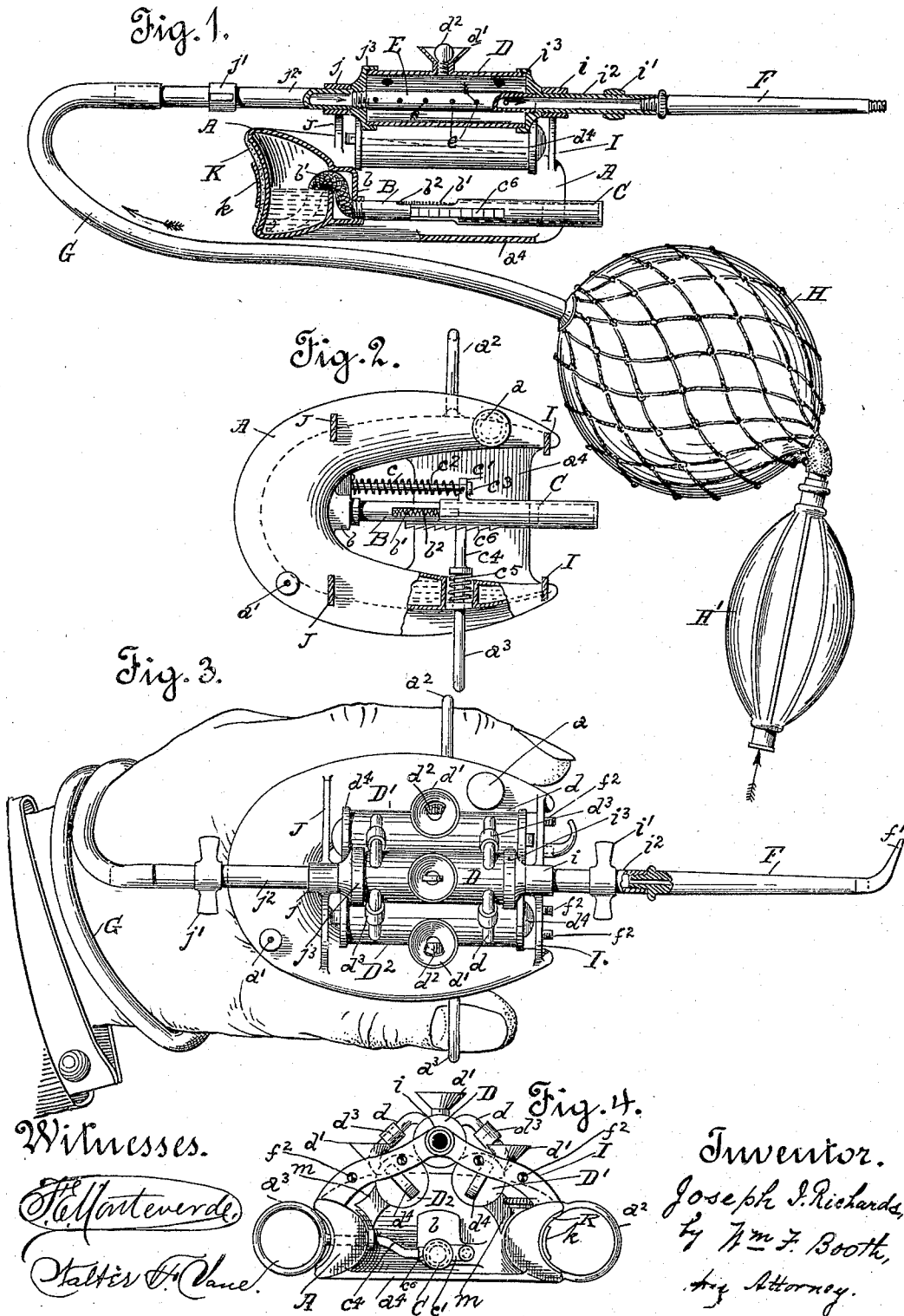
No. 640,947.

Patented Jan. 9, 1900.

J. I. RICHARDS.
HOT AIR SYRINGE.

(Application filed May 2, 1898.)

(No Model.)



UNITED STATES PATENT OFFICE.

JOSEPH I. RICHARDS, OF SAN FRANCISCO, CALIFORNIA.

HOT-AIR SYRINGE.

SPECIFICATION forming part of Letters Patent No. 640,947, dated January 9, 1900.

Application filed May 2, 1898. Serial No. 679,427. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH I. RICHARDS, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Hot-Air Syringes and Vaporizers; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the general class of surgical instruments, and particularly to an instrument or device for the use of physicians and dentists for heating air or vaporizing medicaments and introducing said air or vapor to the localities desired.

The chief object of my invention is to provide an instrument for this purpose which can be conveniently held in one hand and all its operations effected and permitted while so held, thus leaving the other hand free to use such other instrument as the nature of the case demands.

Another object is to provide for the practical adjustment of the device to its several uses, whether said adjustment be required during the operation—as, for example, the proper regulation of the heat—or whether it be the ready and perfect interchange and substitution of parts, such as the change of tips or nozzles or vaporizing-cylinders. In all events and cases, however, including the creation and maintenance of the necessary current of air, the instrument is perfectly adapted for manipulation by one hand only.

My invention consists in a substantially U-shaped hollow stock, which forms the reservoir of the lamp, said stock being adapted, by reason of its shape, to be readily grasped between the finger and thumb of one hand, a vessel or tube carried by the stock above the flame and adapted to receive the air to be heated or the medicament to be vaporized, a suitable nozzle connected with one end of said vessel or tube, and a means at the other end, such as an air-bulb and connections, for forcing a current of air through said vessel or tube and the nozzle, thereby furnishing either heated air or air laden with the vapors of the medicament, as the case may require.

My invention also consists in means for regulating the flame with the same hand that carries the device, means for fitting and re-

moving the several parts, and other details of construction, combination, and arrangement, which I shall hereinafter more fully describe by reference to the accompanying drawings, in which—

Figure 1 is a vertical longitudinal central section of the device, the air-bulb connections being in elevation. Fig. 2 is a top view of the stock and means for regulating the flame, the vaporizing-cylinders and their supporting-brackets being omitted. Fig. 3 is a top view of the complete device, showing how it is held in the hand for use. Fig. 4 is a front end view.

A is the stock or body of the device. In shape it is that of a U or a C or horseshoe, approximately, though I shall call it hereinafter “U-shaped.” Its outer surface is concaved or grooved to enable it to be accurately and firmly grasped between and by the finger and thumb of one hand, as shown in Fig. 3. This stock is made hollow, Fig. 1, for it is also the bowl or reservoir of the lamp, and as such it contains the alcohol or other liquid or material to furnish the heat, which said liquid or material is supplied through a suitable cap-controlled inlet, such as is shown at *a* in Figs. 2 and 3, and a suitable vent, such as *a'*, is also provided, Figs. 2 and 3.

B is the wick-tube, lying about midway between the arms of the stock. It is removably secured to the stock by means of a screw-nipple *b*, Figs. 1 and 2, which enters and communicates with the interior of said stock at a point above the level of the alcohol therein, Fig. 1, and the wick *b'* passes through tube B and nipple *b* and hangs down in the alcohol. There is an elongated opening *b²* in the upper side of the wick-tube, through which the wick is exposed and at which said wick is lighted.

Now in order to control the size of the flame and to regulate it with convenience—that is to say, without having to use but the one hand, which is the hand holding the device—there is the following construction, (shown in Figs. 1 and 2:) Sliding upon the wick-tube is the cap or sleeve C, which is adapted to cover and to expose a part or the whole of the wick-opening *b²*. A spring *c*, Fig. 2, connected with the stock and with a lug *c'* of the sleeve, normally tends to pull said sleeve back

to cover the wick-opening. The lug c' slides on a fixed guide-rod c^2 , the head c^3 of which limits the lug and prevents the sleeve in being pulled forward from moving off the wick-tube. The stock A is provided with finger-rings a^2 and a^3 , Figs. 2, 3, and 4, which primarily serve to better hold the stock to the hand, as in Fig. 3. The ring a^2 is a fixed one; but the ring a^3 forms the head of a pawl or detent c^4 , Fig. 2, which passes through the stock in a suitable seat and has a spring c^5 tending to hold it in. The point of the pawl or detent engages with rack-teeth c^6 on the side of sleeve C. When the sleeve C is pulled forward to its limit, it uncovers the full wick-opening, and said sleeve is held in this position by the detent or pawl c^4 . When it is desired to decrease the flame, the operator simply presses ring a^3 out with his thumb or finger, which is fitted within it. This pulls the pawl c^4 out of engagement with the rack-teeth c^6 and allows sleeve C to be pulled back by the spring c to cover any portion of the wick-opening. Upon relieving ring a^3 the spring c^5 throws the pawl c^4 into its engagement with the teeth c^6 , and thus the sleeve C may be caught and held at any desired point to regulate the size of the flame. This regulation is effected by the same hand that holds the device, thus leaving the other hand free.

Fitted to the top of stock A and lying above the flame in position to be heated thereby is a vaporizing cylinder or vessel D, in which is fitted an air-tube E, Fig. 1, the front end of which is in communication with the nozzle-pipe F, and the rear end is in communication with the air-pipe G, consisting of a sufficiently long flexible hose terminating in a pressure-bulb H and pump-bulb H' of the usual kind, Fig. 1.

Now in cases where hot air alone has to be used, as in syringing out and drying cavities and passages in dental or other operations, the device, as far as described, operates as follows: The stock is held in one hand in the manner heretofore mentioned and as shown in Fig. 3. The flexible hose G is wound around the wrist of the same hand. The palm of the hand grasps the pump-bulb, while the pressure-bulb hangs freely. Air is now pumped into the latter from the pump-bulb H' and a constant and steady stream of air passes through hose G, tube E, and nozzle F and is discharged from the tip of the latter. The wick being lit, the flame heats up the air in its passage and it is discharged as dry and hot as may be desired. The whole operation is effected with one hand, leaving the other free for other work.

In the use of the device as a vaporizer the simplest construction is to make small holes e in air-tube E, Fig. 1, and to put the material to be vaporized in the cylinder D, so that the vapor rising from the heated material will be drawn through holes e by the air-current and carried along by and with it through the nozzle-pipe. In a more complete and sat-

isfactory construction, however, there are, say, two more cylinders like D, designated herein by D' and D², Figs. 3 and 4. These are arranged at each side of and below cylinder D, Fig. 4, and they communicate with the latter through pipes d . In such case the medicinal preparation to be vaporized is placed in D' and D², and being subjected to the heat of the flame the vapors therefrom will rise into D and be drawn into the air-tube and expelled. In order to render these several parts practical and interchangeable, the following constructions are present.

The cylinders are provided with supply-funnels D', normally closed by screw-plugs d^2 . The communicating tubes or pipes d have union-nuts d^3 let into them, whereby the several cylinders may be disconnected when required. The cylinders D' and D² are provided with removable screw caps or heads d^4 . Upon top of stock A, at its front, is a bracket I, having a central socket or sleeve i , in which is fitted and adapted to be turned on its axis, by means of a small finger-hold i' , a tubular coupling-section i^2 , Fig. 1, having on its inner end a coupling-flange i^3 , adapted to receive the forward end of cylinder D. At the base of stock A is a bracket J, having a central socket or sleeve j , receiving a turnable tubular coupling-section j^2 , having a finger-hold j' and carrying at its inner end a coupling-flange j^3 , adapted to receive the rear end of cylinder D. Thus cylinder D and, in case of a plurality of cylinders, D' and D² are all removably secured to the stock. When in place, the lower cylinders may rest on small supports m , fixed to stock A, Fig. 4. The coupling-section i^2 in front receives the removably-attached nozzle F, which may be provided with a removable section, as usual, and which is adapted to receive any form of tip desired or required. One form of tip I show by f' , Fig. 3. Said coupling-section at its inner end is in communication with air-tube E. The rear coupling-section j^2 at its inner end is in communication with the said air-tube E, and at its rear end it receives and communicates with the flexible air pipe or hose G. Thus the air-passage is formed and the cylinders are readily removable for repairs and cleaning or for the substitution of others when required—as, for example, when other medicaments are to be used or such as require special cylinders to resist the corrosive or oxidizing action of such materials as require to be vaporized. The removable screw caps or heads d^4 permit the interior of the cylinders to be readily reached for cleaning purposes. Upon the front of the forward bracket I are small threaded nipples f^2 to receive and keep safely such of the tips f' as may not be in use.

It is not likely that the stock A will become too warm for the hand to hold, because its liquid contents will prevent the communication of the heat; but in case it should get too hot I will fit to its groove a piece of nonconducting material K, such as asbestos, and

clamp it to its seat by a spring *k*. Under the stock A is a cross-plate *a*⁴ to protect the hand from the heat.

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

1. In a hand apparatus of the kind described and in combination, a hollow substantially U-shaped lamp-reservoir adapted to be grasped and held between the forefinger and thumb of the operator's hand, a wick-tube communicating with said reservoir and extending between the arms thereof, a heating vessel above said wick-tube, and means for inducing a current of air through said heating vessel flexibly connected thereto and adapted to be operated by the same hand, substantially as described.

2. In a hand apparatus of the kind described and in combination, a hollow substantially U-shaped lamp-reservoir adapted to be grasped and held between the forefinger and thumb of the operator's hand, a wick-tube communicating with said reservoir and extending between the arms thereof, a flame-regulator, a heating vessel above said wick-tube, controlling means for said regulator adapted to be operated by the same hand, and means for inducing a current of air through said heating vessel flexibly connected thereto and adapted to be operated by the same hand, substantially as described.

3. In a hand apparatus of the kind described, and in combination, a hollow substantially U-shaped lamp-reservoir adapted to be grasped and held between the forefinger and thumb of the operator's hand, a wick-tube communicating with said reservoir and extending between the arms thereof, a heating vessel above said wick-tube, a nozzle projecting from one end of said heating vessel, and means for inducing a current of air through said heating vessel and suitably connected to the other end thereof and adapted to be operated by the same hand, substantially as described.

4. In a hand apparatus of the kind described, and in combination, a hollow substantially U-shaped lamp-reservoir adapted to be grasped and held between the forefinger and thumb of the operator's hand, a wick-tube communicating with said reservoir and extending between the arms thereof, a heating vessel above said wick-tube, a vessel to contain a medicament to be vaporized and communicating with said heating vessel, a nozzle projecting from one end of said heating vessel, and means for inducing a current of air through said heating vessel and connected to the other end thereof by a flexible tube and adapted to be operated by the same hand, substantially as described.

5. In a hand apparatus of the kind described, and in combination, a hollow substantially U-shaped lamp-reservoir adapted to be grasped and held between the forefinger and thumb of the operator's hand, a wick-tube communicating with said reservoir and extending between the arms thereof, a heating vessel above said wick-tube, a vessel to contain a medica-

ment to be vaporized and communicating with said heating vessel, a nozzle projecting from one end of said heating vessel, and an air-bulb for inducing a current of air through said heating vessel and connected to the other end thereof by a flexible tube and adapted to be operated by the same hand, substantially as described.

6. A hot-air syringe and vaporizer, comprising a U-shaped hollow stock shaped to be held between the finger and thumb of one hand and to contain the alcohol or other material from which the heat is to be generated, said stock having a wick-tube projecting forwardly between its arms, with a suitable burner, a vessel or cylinder carried by the stock above the burner and in position to be subjected to the flame thereof, said vessel being adapted to contain the medicament to be vaporized, a perforated tube passing through said vessel, a suitable nozzle in communication with one end of said tube, and a means adapted to be operated by the same hand and communicating with its other end for forcing air through said tube and nozzle.

7. A hot-air syringe and vaporizer, comprising the U-shaped hollow stock forming the lamp-reservoir and having the wick-tube with its burner said stock being shaped to be held between the finger and thumb of one hand, an air-tube carried by the stock in position to receive the heat from the burner, a suitable nozzle at the front of the air-tube, and an air-bulb and connections to the other end of the tube whereby a current of air is forced through said tube and nozzle.

8. In a hand apparatus of the kind described and in combination, a hollow substantially U-shaped lamp-reservoir adapted to be grasped and held between the forefinger and thumb of the operator's hand, a wick-tube and burner communicating with said reservoir and extending between the arms thereof, a plurality of intercommunicating cylinders or vessels in position to be heated by the flame, and means for inducing a current of air through one of said heating vessels connected thereto and adapted to be operated by the same hand, substantially as described.

9. A hot-air syringe and vaporizer comprising a U-shaped hollow stock forming the lamp-reservoir and provided with a wick-tube and burner, the plurality of intercommunicating cylinders carried by the stock in position to be heated by the flame, a perforated air-pipe passing through one of said cylinders, a nozzle connected with one end of said air-pipe and an air-bulb and connections with its other end.

10. In a hot-air syringe and vaporizer, and in combination with means for inducing, conveying and discharging a current of air, a hollow U-shaped stock carrying said means and adapted to be held between the finger and thumb of one hand, and to contain the material from which the heat is to be generated, a wick-tube communicating with said stock, and extending forwardly between its

arms, said tube having a burner-opening adapted to direct the flame upon the means for conveying the air, whereby said air is heated in its passage, and means adapted to
5 be controlled by the finger or thumb of the holding-hand, for regulating the size of the frame from the burner-opening, said means consisting of the sliding cap on the wick-tube, having the rack-teeth, the spring tend-
10 ing to force said cap over the burner-opening, and the finger-ring and spring-controlled pawl engaging the rack-teeth of the cap, to hold and release it.

11. A hot-air syringe and vaporizer, comprising the U-shaped hollow stock forming the lamp-reservoir and provided with a wick-tube having a burner-opening, a sliding cap to control said opening, the spring, the pawl, the rack-teeth and the finger-ring to operate
20 said cap, suitable means carried by the stock for subjecting air or material to be vaporized to the flame, a nozzle connected with said means and an air-bulb and connections for supplying the current of air.

25 12. In a hot-air syringe and vaporizer, the combination of the U-shaped hollow stock

forming the lamp-reservoir and provided with a suitable burner, the vessel or cylinder to be heated, the brackets on top of the stock, the axially-rotary coupling-sections seated in said
30 brackets and the coupling-flanges of said sections adapted to engage with the vessel or cylinder whereby it is removably secured to the stock.

13. In a hand apparatus of the kind de-
35 scribed, the combination of a lamp having a portion shaped to be grasped between and rest upon the forefinger and thumb of the operator's hand, devices for securing the same upon the hand, one of which is mov-
40 able, a heating vessel, a nozzle, means for forcing air through said vessel and nozzle, and a regulator for the flame of said lamp adapted to be operated by said movable de-
45 vice, substantially as described.

In witness whereof I have hereunto set my hand.

JOSEPH I. RICHARDS.

Witnesses:

D. B. RICHARDS,
WALTER F. VANE.