

No. 720,071.

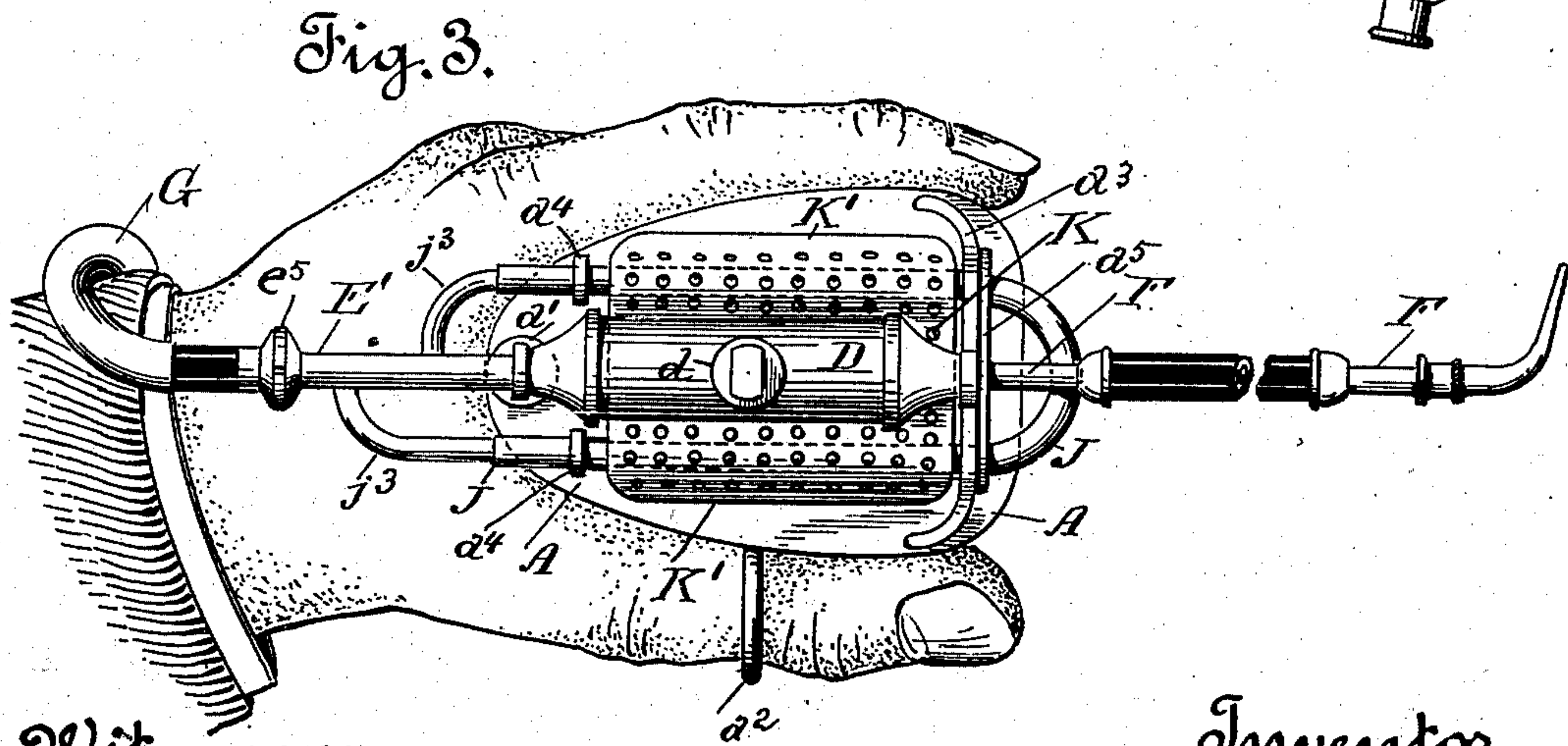
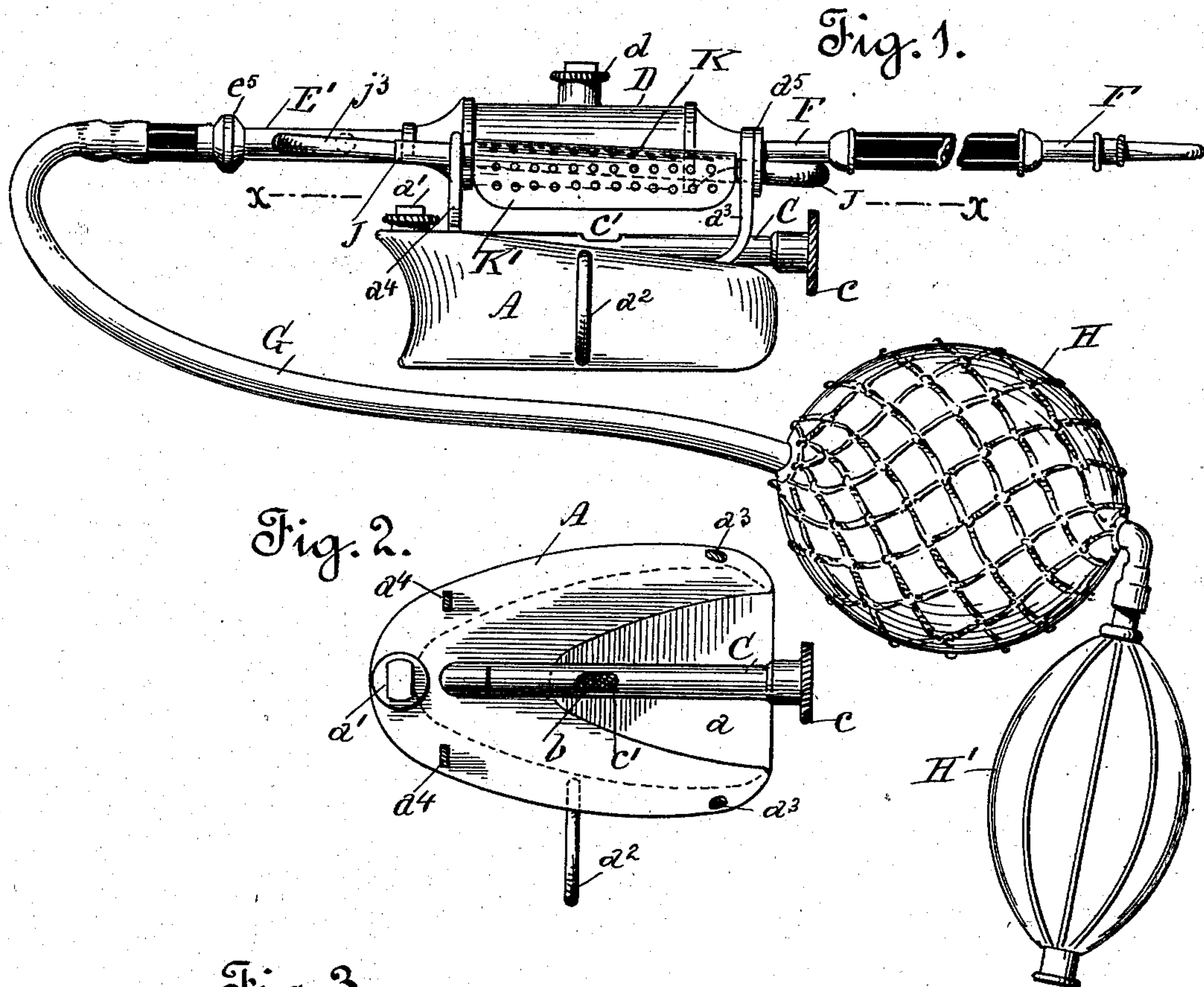
PATENTED FEB. 10, 1903.

J. I. RICHARDS.
HOT AIR SYRINGE.

APPLICATION FILED MAR. 24, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses.

Steffenverde.
Chatter F. Lane.

Inventor.
Joseph I. Richards
by *Wm F. Booth*
his Attorney.

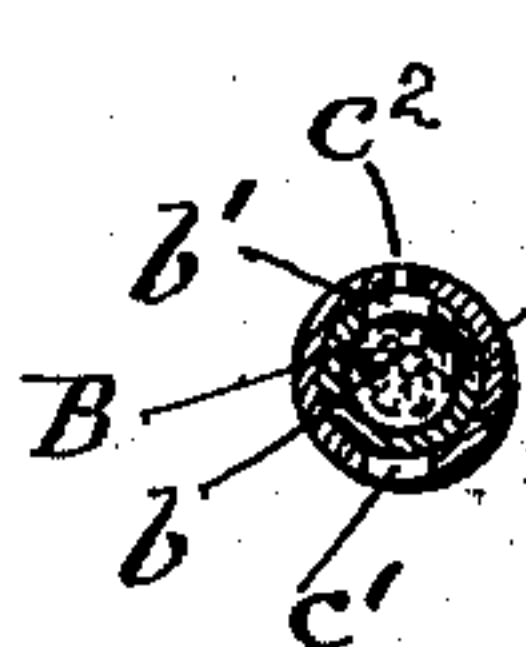
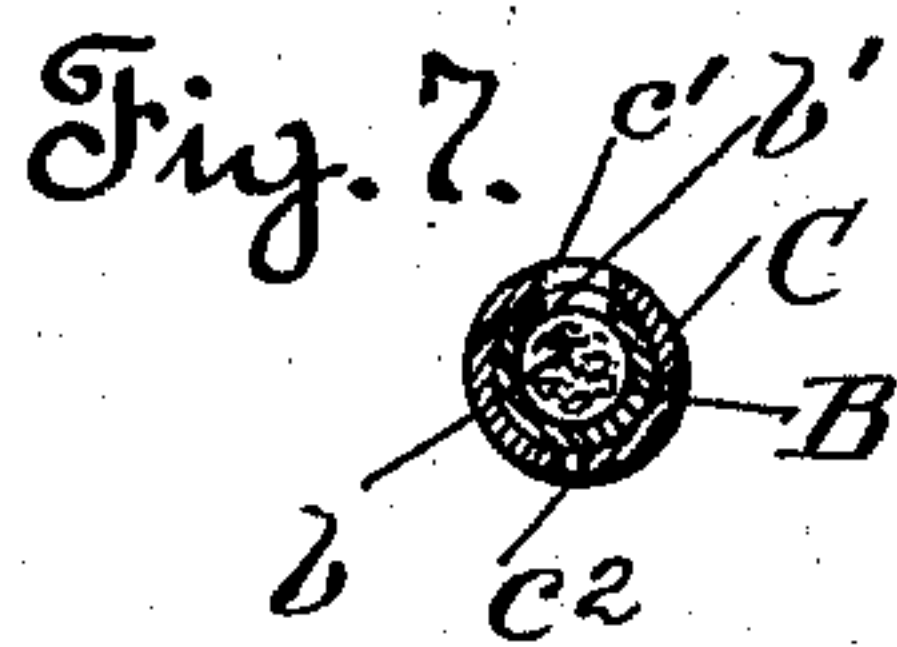
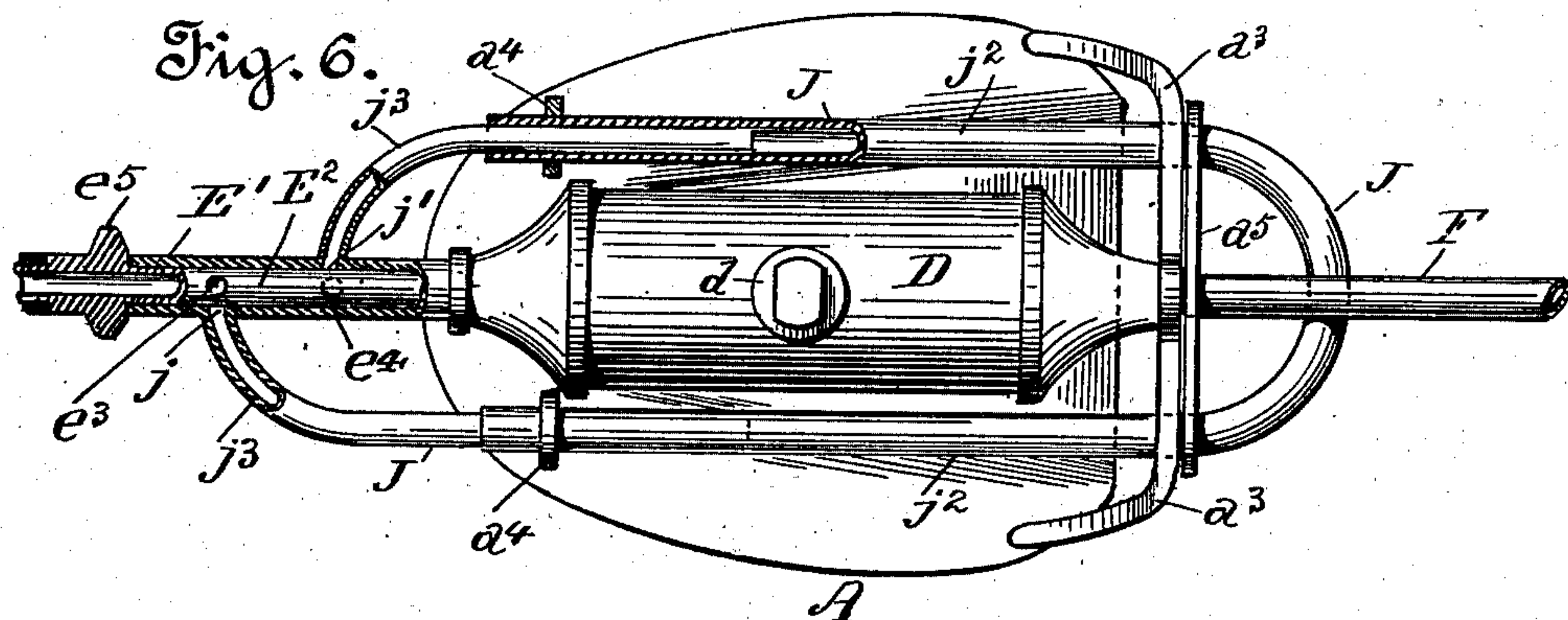
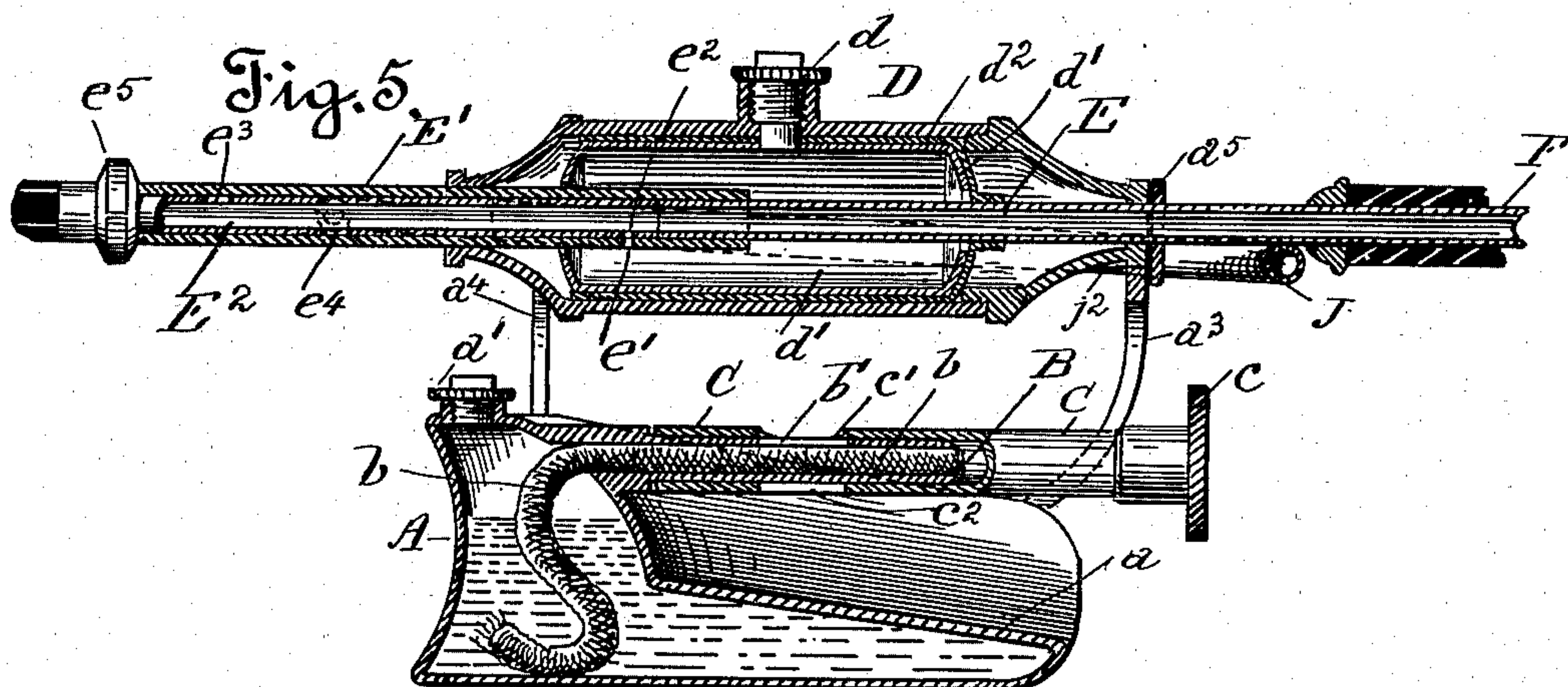
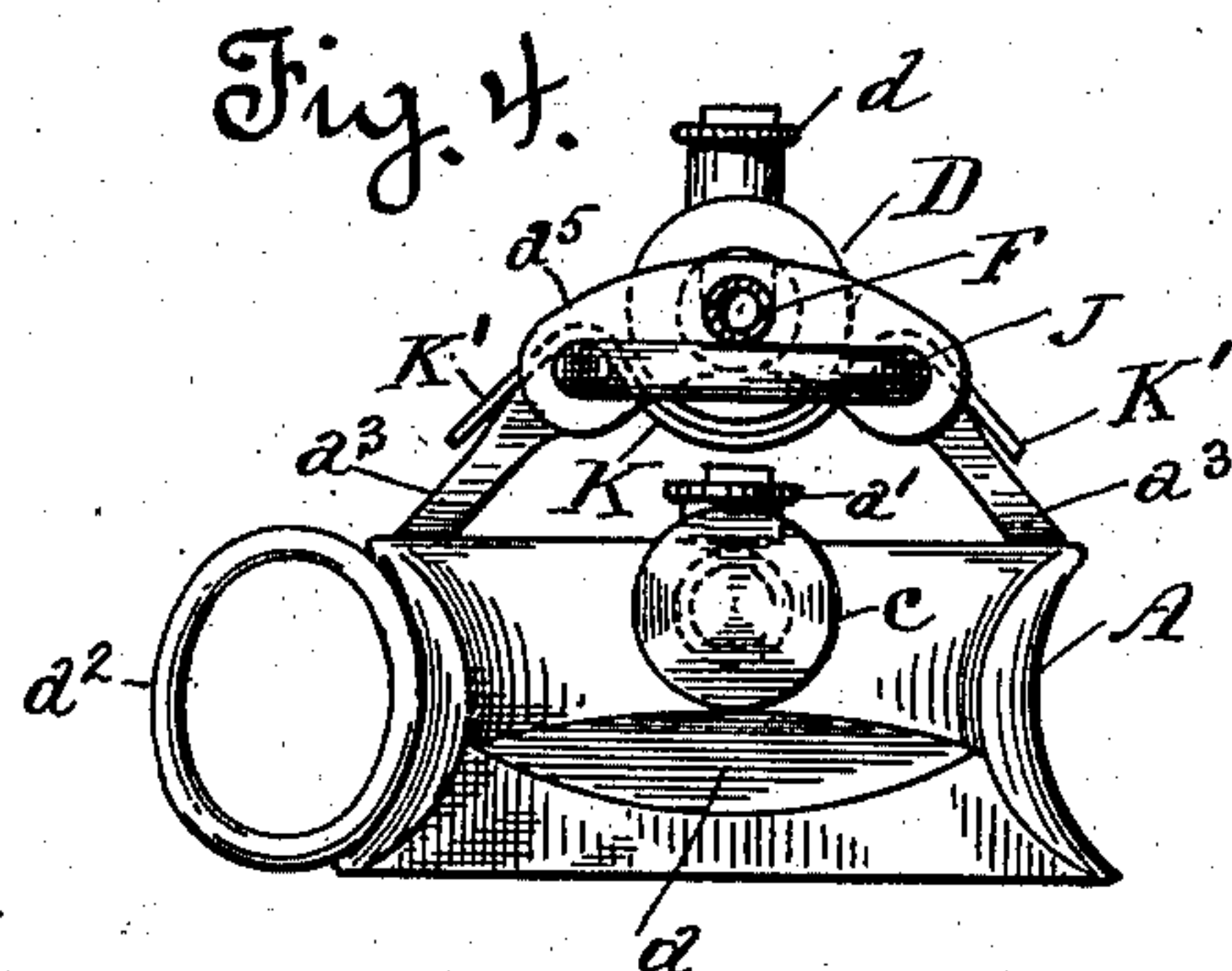
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NO MODEL.

2 SHEETS—SHEET 2.



Witnesses.
H. Monteverde.
 Walter F. Vance.

Fig. 8.
C Inventor.
Joseph I. Richards
by Wm. F. Booth
his Attorney

UNITED STATES PATENT OFFICE.

JOSEPH I. RICHARDS, OF SAN FRANCISCO, CALIFORNIA.

HOT-AIR SYRINGE.

SPECIFICATION forming part of Letters Patent No. 720,071, dated February 10, 1903.

Application filed March 24, 1902. Serial No. 99,591. (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, State of California, have invented certain new and useful Improvements in Hot-Air Syringes; 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 known as "hot-air syringes," and particularly to an instrument of the character secured to me by Letters Patent of the United States No. 640,947, dated January 9, 1900, which is 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.

My present invention is an improvement in the said instrument; and said invention consists in certain changes in construction and arrangement whereby simplicity and economy are secured in the manufacture and a more convenient and efficient operation is obtained.

More specifically, these improvements consist in means for controlling the lamp-flame, means for variously controlling the direction and course of the air-current to send it direct either with or without medicinal vapor or to change its course in part to a circuitous route whereby its heat is increased, a novel construction and arrangement of said air courses, a novel lock connection between the parts, a novel construction of the base of the stock or lamp-reservoir, a novel construction of the heating-cylinder, a novel heat radiating and protecting screen, and other features, all of which I shall hereinafter fully describe by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my device. Fig. 2 is a top plan of lamp-reservoir and wick-tube on line *xx* of Fig. 1. Fig. 3 is a top plan of the complete device, showing how it is held in the hand for use. Fig. 4 is a front end view of the device. Fig. 5 is an enlarged vertical longitudinal section, radiating-plate *K* being omitted. Fig. 6 is a top plan of Fig. 5 partly broken. Fig. 7 is an enlarged cross-section of wick-tube and flame-controlling sleeve, showing the position ready

to ignite the wick. Fig. 8 is a similar section showing the sleeve turned half around to present small slit *c*².

A is the U-shaped or horseshoe-shaped body or stock of the device, which also forms the bowl or reservoir of the lamp, as seen in Fig. 5, to contain the alcohol or other liquid or material to furnish the heat, said body or stock being adapted to be grasped between and by the finger and thumb of one hand, as shown in Fig. 3. An improvement in this stock consists, as shown in Fig. 5, in making its bottom *a*, which extends across between the arms of said stock and which primarily protects the hand of the operator, hollow, its cavity communicating with and forming part of the stock-cavity, whereby the capacity of the reservoir is materially increased. The body or stock is provided with a cap-controlled filling-inlet at *a'*, and one side of it has the ring *a*² for the thumb of the operator.

B is the wick-tube, Fig. 5, communicating with the reservoir-stock and lying about midway and projecting forwardly between its arms. The wick *b* lies in the tube and enters the reservoir-stock for its supply of inflammable liquid or vapor. In the top of the wick-tube *B*, about midway of its length, is an opening *b'*, through which the wick is exposed, whereby it may be ignited. In order to control the size of the flame, there is fitted over the wick-tube a sleeve *C*, Figs. 1, 2, and 5, which is axially rotatable upon the tube, being turned readily by means of a disk *c* on its forward end. In this sleeve is an opening *c'* in the plane of and adapted by the axial movement of the sleeve to coincide or aline either wholly or partially with the opening *b'* in the wick-tube. When fully alined therewith, as is shown in Fig. 7, flame is the largest, and when partially alined by the turning of the sleeve the flame is reduced in size. In order to increase the efficiency of the burner, there is made in the sleeve *C*, directly opposite the hole *c'* therein, a small hole or slit (preferably a slit) *c*². When the wick is ignited through opening *c'*, the surplus of alcohol between the sleeve and tube takes fire and the flame issues through the slit *c*² below, as well as from the opening *C'* above. Then as soon as the parts are heated sufficiently the sleeve *C* may be turned half around, as seen

in Fig. 8, so that the slit c^2 lies above the wick, and thereafter practically the vapor alone is burned, making a very efficient heat.

Lying above the wick-tube and in position to be heated by the flame is the heating or vaporizing cylinder D, the forward end of which lies in a notch in the front bracket-frame a^3 of stock A, Figs. 4 and 6. Into the front end of this cylinder enters a tube E, Fig. 5, the outer end of which forms nozzle-pipe F. Into the rear end of the cylinder a pipe E' enters, the inner end of which telescopes over the inner end of tube E. In pipe E' is fitted the tube E², the inner end of which abuts against the end of tube E and the outer end of which connects with a flexible air-hose G, which terminates in a pressure-bulb H and pump-bulb H', Fig. 1. It will now be seen that if air be forced through abutting tubes E and E² it will be heated as it flows through that portion of the connection within cylinder D, which cylinder is subjected to the heat of the lamp-flame. If medicinal vapors are desired, the proper medicaments are placed in cylinder D, being supplied through a cap-controlled inlet d , and said substances being heated will give off vapors, which will pass into the air-passage through small holes e' and e^2 , made in the pipe E' and tube E², respectively, Fig. 5. This is the direct course of the air, either with or without medicinal vapors. If air alone and but slightly heated be required, the tube E² is turned in the pipe E', so as to throw the holes e' and e^2 out of alinement, thereby closing the communication of the cylinder with the air-passage, or if vapor-laden or medicated air be required the holes e' and e^2 are brought into line. Now in order to more highly heat the air when required I divert it or a portion of it through a longer or indirect course. For this purpose I have a tube J, which springs from the pipe E' at the point j back of the cylinder, Fig. 6, and thence extends forwardly beside cylinder D, around the front and back on the other side, and enters the pipe E' at the point j' between point j and the cylinder. The two sides of the tube J are exposed to the heat of the flame. If now the direct course of the air be wholly or partly cut off, the air or a portion of it will be forced around through the longer course in tube J and will be heated preliminarily before entering the air-passage again and flowing in said passage through the heating-cylinder D. To effect this change from the direct to the indirect course and back again, I provide in the tube E² a hole e^3 , Figs. 5 and 6, adapted to be carried by the turning of the tube into and out of line with the issuing-point j of tube J, and a hole e^4 , adapted by the same movement to be carried into and out of alinement with the reëntering point j' of tube J. These two holes are so located relatively to the hole e^2 in tube E that when they aline with the points j and j' the hole e^2 will not register with the hole e' in pipe E', and thus when the communication with tube

J is open the communication between the cylinder D and the air-passage is closed and no medicinal vapors will enter said passage. A brief description of the operation at this point will make this clear. The "first position," as I shall call it, is such that the tube E², which is really a valve, is so turned that its communication with the circuitous tube J is closed, but its communication through the holes e^2 and e' with the cylinder D is open. This is shown in Figs. 5 and 6. The medicament-vapors may therefore rise into the air-passage and be carried by the mildly-heated air forward into the nozzle-pipe F. In the second position the valve-tube E² is turned to close the cylinder communication through e' and e^2 and to open the communication with tube J at e^3 and j and at e^4 and j' . Thereupon while a portion of the air will be forced directly forward through the direct course a portion will move around through the circuitous course in tube J and will be thereby heated to a higher degree. This air reëntering the passage at j' at a point in advance of its exit therefrom will mingle with and raise the temperature of the direct air; but there will be no medicinal vapors mixed with the air. The third position is when the valve-tube E² is so turned as to cut off all its side connections, and in this case the air without any vapor will be forced directly through the passage. In order to readily manipulate the valve-tube E², I have a thumb-disk e^5 on its end, which may be provided with marks indicating the position.

It is of importance in an instrument of this character that its parts shall be easily separated to cleanse them. I therefore make the tube J in separable telescopic sections, as is shown in Fig. 6. The front section j^2 is U-shaped and slips through holes in the front stock-bracket a^3 and through holes in the rear stock-posts a^4 , and the rear section j^3 of the tube slip into the arms of this front section. This tube J thus serves also to carry and support the cylinder and its air-pipes from and by the stock, the forward end of the cylinder being secured in its notch in the bracket a^3 by a cross yoke-plate a^5 , which is slipped upon tube J and upon the nozzle-pipe F. Now by directly pulling out the front U-shaped section of tube J the parts are all separable and may be cleaned.

Though cylinder D may directly contain the medicament, I deem it best to provide for fitting into the cylinder a separate cartridge which contains said medicament. This cartridge consists, as shown in Fig. 5, of two thin metallic shells d' and d^2 , which telescope together, and may thus be taken apart to clean them or to introduce fresh material. The end of cylinder D being unscrewed, the medicament-cartridge is slipped into the cylinder, fitting over the pipes E and E' therein, as shown. The screw-cap d , fitting down into the top of the cartridge, holds it in place.

In order to better heat the parts, I have the

perforated or screen radiating-plate K, Figs. 2, 3, and 4. This is curved under the cylinder D, Fig. 4, and is flanged over and suspended from the sides of tube J, its flanges K' hanging down far enough to furnish side barriers to the heat, thereby both confining the heat, giving a large radiating-surface, and protecting the operator. It also protects the cylinder D from the direct flame.

The manner of using the instrument and its operation are as follows: The stock is held in one hand, being grasped between the thumb and finger, Fig. 3. The flexible hose G is wound around the wrist of the same hand or is left to hang, as preferred. The palm of the same hand grasps the pump-bulb, while the pressure-bulb hangs freely. Air is then pumped into the latter from the pump-bulb, and a constant and steady stream of air passes through the hose G, the air-passages, and the nozzle F and is discharged from the tip of the latter. The wick being lighted, the flame heats up the air in its passage, and it is discharged as dry and hot, as may be desired, the degree of heat being regulated both by the size of the flame and by sending the air either in its direct or its indirect course. The whole operation is effected with one hand, leaving the other hand free for other work.

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, the combination of the substantially U-shaped lamp-reservoir forming the stock to be grasped by the hand, a wick-tube lying between the arms of the stock and communicating with said reservoir and having an opening in it for exposing the wick to be lighted, an air-passage exposed to the heat of the flame from the lighted wick and provided with means for inducing a current of air through said passage, and the means for regulating the size of said flame consisting of a sleeve mounted and axially rotatable on the wick-tube, said sleeve having an aperture adapted by the axial movement of the sleeve to be thrown partially or wholly into and out of alinement with the opening in the wick-tube.

2. In a hand apparatus of the kind described, the combination of the substantially U-shaped lamp-reservoir forming the stock to be grasped by the hand, a wick-tube lying between the arms of the stock and communicating with said reservoir and having an opening in it for exposing the wick to be lighted, an air-passage exposed to the heat of the flame from the lighted wick and provided with means for inducing a current of air through said passage, and the means for regulating the size of said flame consisting of a sleeve mounted and axially rotatable on the wick-tube, said sleeve having an aperture adapted by the axial movement of the sleeve to be thrown partially or wholly into and out of alinement with the opening in the wick-tube

and said sleeve having also a contracted opening in its side opposite its first aperture.

3. In a hand apparatus of the kind described, the combination of the substantially U-shaped lamp-reservoir forming the stock to be grasped by the hand, a wick-tube communicating with said reservoir and having an opening exposing the wick to be lighted, an air-passage exposed to the heat of the flame from the lighted wick and provided with means for inducing a current of air through said passage, a circuitous branch air-tube issuing from and reëntering said air-passage said branch tube being exposed in its course to the heat of the lamp, and a suitable valve for controlling the branch tube.

4. In a hand apparatus of the kind described, the combination of the substantially U-shaped lamp-reservoir forming the stock to be grasped by the hand, a wick-tube communicating with said reservoir and having an opening exposing the wick to be lighted, an air-passage exposed to the heat of the flame from the lighted wick and provided with means for inducing a current of air through said passage, a circuitous branch air-tube issuing from and reëntering said air-passage, said branch tube being exposed in its course to the heat of the lamp, and an axially-rotatable valve-tube seated in the air-passage and having ports controlling the branch tube.

5. In a hand apparatus of the kind described, the combination of the substantially U-shaped lamp-reservoir forming the stock to be grasped by the hand, a wick-tube communicating with said reservoir and having an opening exposing the wick to be lighted, a hollow cylinder carried by the stock above and exposed to the lamp-flame, an air-passage through said cylinder, provided with means for inducing an air-current therethrough, said passage and cylinder having a communication, and a rotary valve-tube in the air-passage provided with a port controlling said communication.

6. In a hand apparatus of the kind described, the combination of the substantially U-shaped lamp-reservoir forming the stock to be grasped by the hand, a wick-tube communicating with said reservoir and having an opening exposing the wick to be lighted, a hollow cylinder carried by the stock above and exposed to the lamp-flame, an air-passage through said cylinder, provided with means for inducing an air-current therethrough, said passage and cylinder having a communication, a circuitous branch air-tube issuing from and reëntering said air-passage, said branch tube being exposed in its course to the heat of the lamp, and an axially-rotatable valve-tube seated in the air-passage and having ports controlling the branch tube and controlling also the communication between the air-passage and the hollow cylinder.

7. In a hand apparatus of the kind described, the combination of the U-shaped

- hollow stock with its wick-tube, the hollow cylinder, the air-passage pipes therethrough, the sectional telescopic branch tube connected with the air-passage pipe, the brackets
5 and posts of the stock in which the sectional air branch tube is separably fitted and the locking yoke-plate fitted on the forward end of branch tube and the air-passage pipe substantially as herein described.
- 10 8. In a hand apparatus of the kind described the U-shaped lamp-reservoir forming the stock to be grasped by the hand, and having a hollow cross bottom between its arms, said bottom forming part of the reservoir.
- 15 9. In a hand apparatus of the kind described, and in combination with its U-shaped hollow stock, and air-passage pipes, the hollow cylinder through which said pipes pass and the insertible medicament-cartridge fitted in said cylinder and consisting of separable telescopic sections.
- 20 10. In a hand apparatus of the kind described, the combination of the substantially

U-shaped lamp-reservoir forming the stock to be grasped by the hand, a wick-tube lying 25 between the arms of the stock and communicating with said reservoir, said wick-tube having an opening exposing the wick to be lighted, a heating-cylinder above and exposed to the heat of the lamp-flame, an air-passage through 30 said cylinder, means for inducing a current of air through said passage, the circuitous branch tube issuing from and reëntering said air-passage and extending on each side of the cylinder and exposed to the heat of the lamp- 35 flame, means for controlling said branch tube and the radiating-plate lying under the cylinder and flanged over and suspended from the sides of the branch tube.

In witness whereof I have hereunto set my 40 hand.

JOSEPH I. RICHARDS.

Witnesses:

WALTER F. VANE,
D. B. RICHARDS.