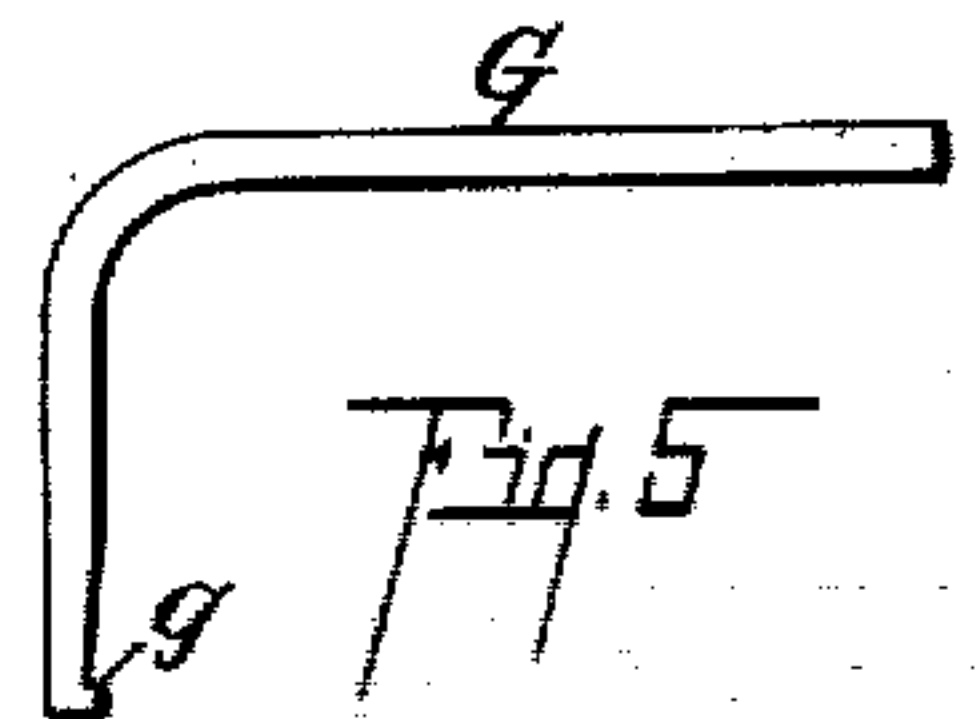
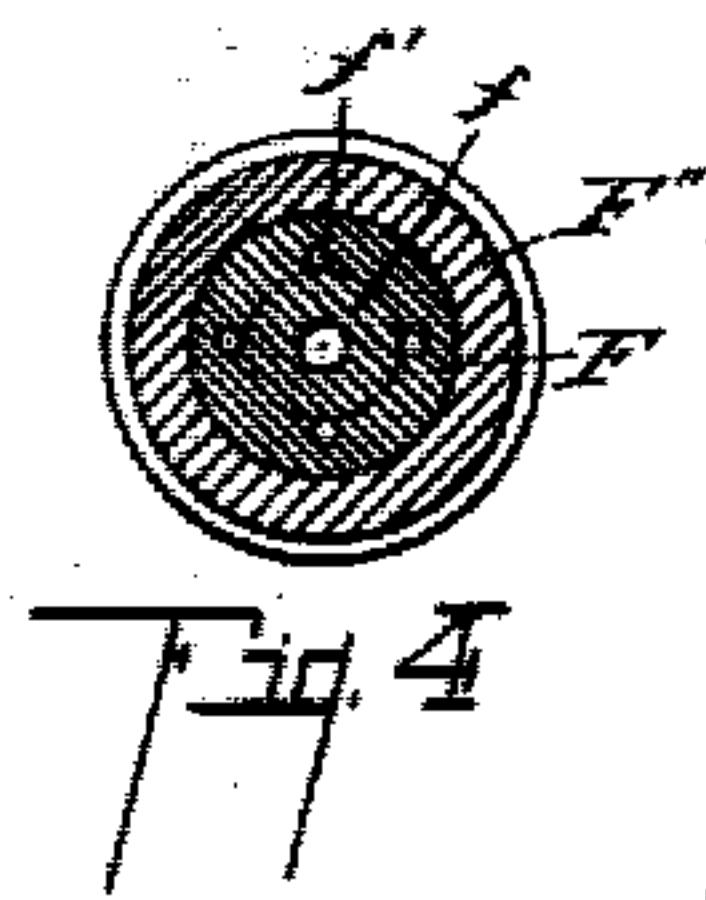
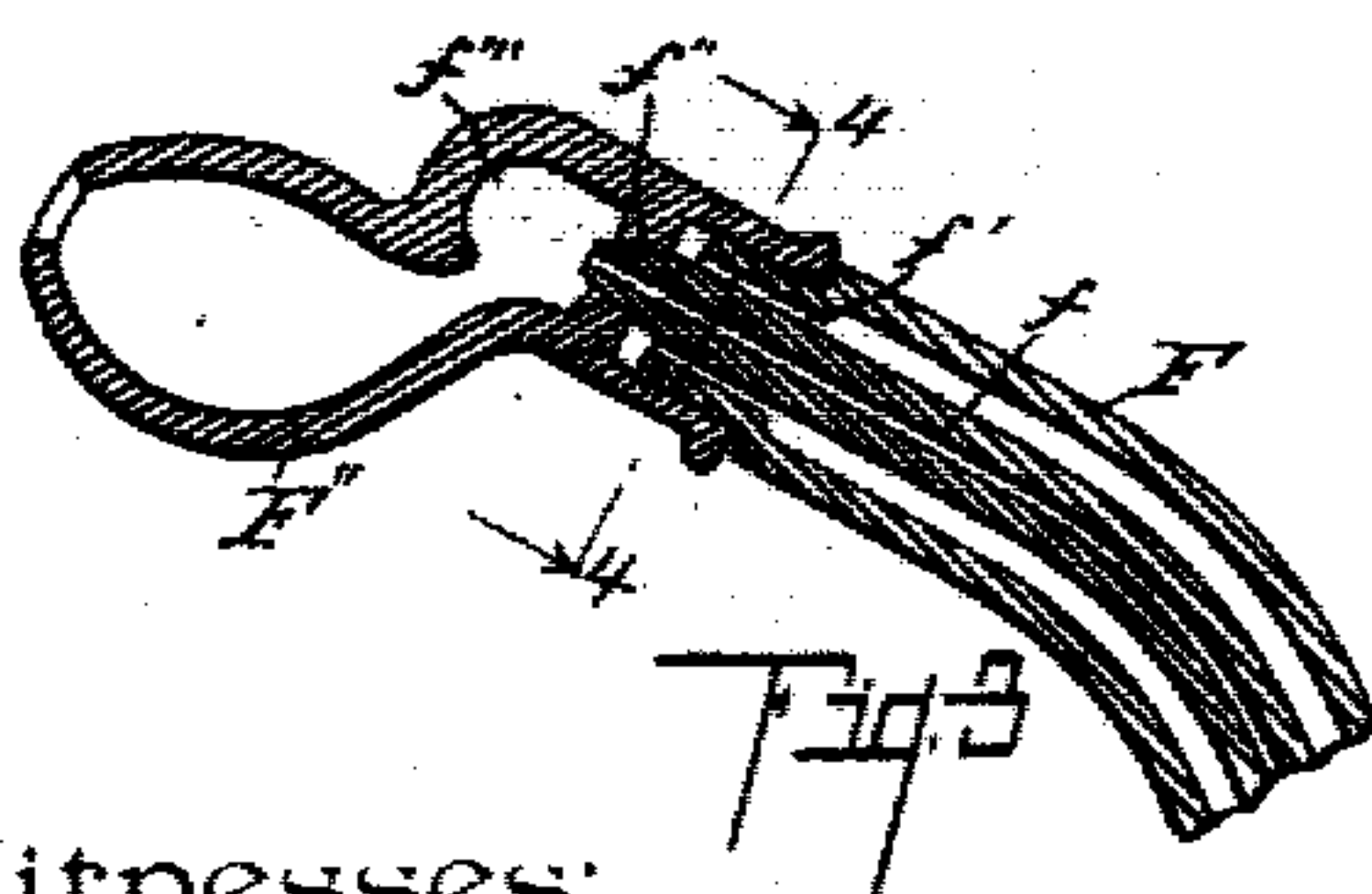
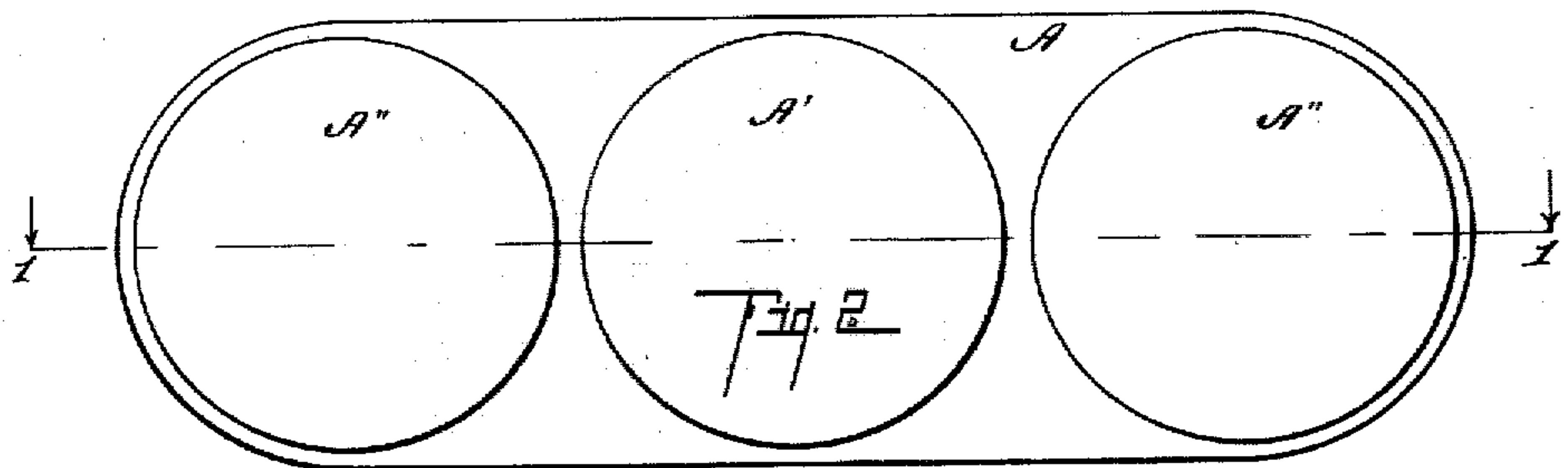
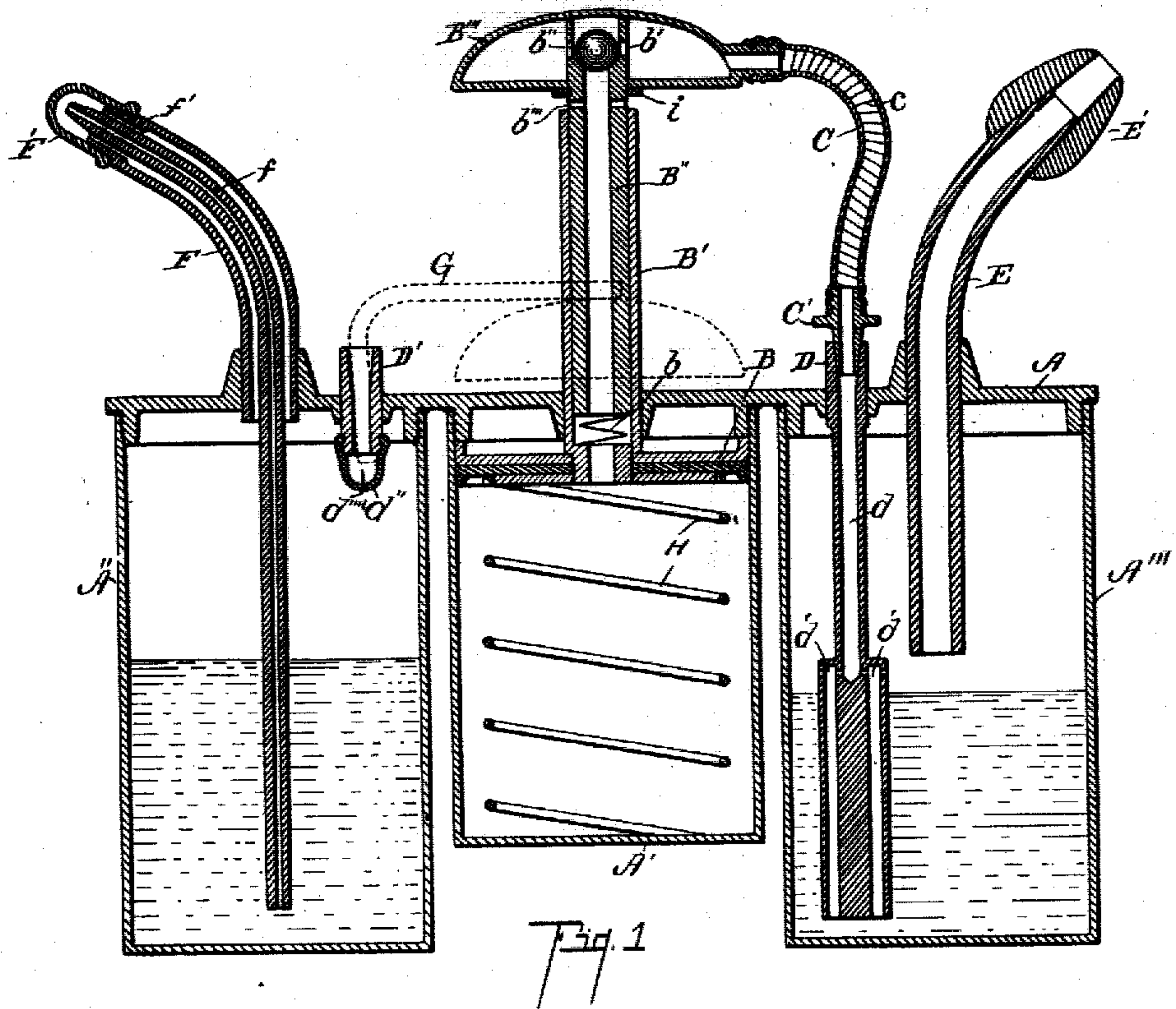


No. 828,722.

PATENTED AUG. 14, 1906.

F. C. DORMENT.
ATOMIZER AND LIKE INSTRUMENT.
APPLICATION FILED OCT. 17, 1905.



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UNITED STATES PATENT OFFICE.

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ATOMIZER AND LIKE INSTRUMENT.

No. 828,722.

Specification of Letters Patent.

Patented Aug. 14, 1906.

Application filed October 17, 1905. Serial No. 283,124.

To all whom it may concern:

Be it known that I, FRANK C. DORMENT, a citizen of the United States, residing at the city of Kalamazoo, county of Kalamazoo, State of Michigan, have invented certain new and useful Improvements in Atomizers and Like Instruments, of which the following is a specification.

This invention relates to improvements in atomizers and like instruments.

The objects of this invention are, first, to provide an improved instrument of the class described adapted for use either as an atomizer or nebulizer or as a sprayer; second, to provide a combination atomizer or nebulizer and spraying device which is very compact, simple in structure, and convenient to use; third, to provide an improved spraying device by which the spray is delivered in a practically continuous stream; fourth, to provide an improved spraying device which may be quickly converted into a nasal douche; fifth, to provide in an instrument of the class described an improved air-pump.

Further objects and objects relating to structural details will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical section of my improved combination atomizer or nebulizer and spraying device, taken on a line corresponding to line 1 1 of Fig. 2. Fig. 2 is an inverted plan of the structure appearing in Fig. 1. Fig. 3 is an enlarged detail section showing the structure modified as a nasal douche. Fig. 4 is a detail section taken on a line corresponding to line 4 4 of Fig. 3. Fig. 5 is an elevation of the locking-piece G for holding the plunger-rod of the pump in its inner position.

In the drawings the sectional views are taken looking in the direction of the little arrows at the ends of the section-lines, and similar letters of reference refer to similar parts throughout the several views.

Referring to the drawings, the cap-plate A

is provided with downwardly-projecting threaded flanges to receive the medicament-receptacles A' A'' and the pump-cylinder A'. The pump-cylinder is preferably arranged between the medicament-receptacles. The medicament-receptacles are thus properly sealed and connected and supported in proper relation to the pump.

The plunger B is of the usual or any desired construction and is secured to the inner end of the plunger-rod section B'. This plunger-rod section is tubular and forms an air-delivery passage for the pump. The plunger-rod section B'' is telescopically arranged within the section B'. This section is also tubular. On the upper end of the rod-section B'' is a hollow finger-piece B''', into which it delivers. The upper end of the plunger-rod section B'' is formed into a valve-seat, and a ball-valve, as b'', is provided to serve as a check-valve, preventing the return of the air. Below the finger-piece B''' the section B'' is provided with air-inlet ports b'''. The section B'' is held normally upward by the spring b, so that when the plunger-rod is in its normal position these ports are open.

The plunger is held normally up in the pump-cylinder by the coiled spring H, which is arranged under it. This coiled spring is of greater tension than the spring b for the plunger-rod section B'', so that when pressure is applied to the plunger-rod the rod-section B'' slides into the section B', thereby closing the intake-ports b''', and thereby causing the air to be delivered past the check-valve b''.

A gasket i is arranged on the rod-section B'', so that it engages the end of the section b on the inward movement of the plunger, thereby more effectively sealing the same.

The air is delivered from the chambered finger-piece b''' by means of the flexible tube C. This is preferably of rubber, with a coiled spring c arranged within the same to prevent its being kinked or collapsed, thereby preventing the passage of the air. On the end of this delivery-tube is a tip C', which is adapted to be inserted into the upper end of the atomizer-tube D or into the nipple D' for the sprayer. The atomizer-tube D is arranged through and carried by the cap-plate A. The atomizer-tube is provided with a suitable air-passage d and medicament-pas-

sage d' , these passages being arranged in the well-known manner. However, I preferably form the medicament-passage as an annular chamber and provide two or more delivery-openings d'' , as is illustrated in the drawings. The medicament-delivery tube E is also carried by the cap-plate A, as clearly appears from the drawings. This delivery-tube preferably extends into the receptacle to a central point, so that it serves as a trap to prevent the spilling of the medicament.

A nasal tip E' is provided for the delivery-tube E. If it is desired to use the apparatus for treatment through the mouth, the nasal tip E' is removed. When it is desired to use the apparatus as a spraying apparatus, the air-delivery tube C is connected to the nipple D' .

On the inner end of the nipple D' is a valve, consisting of a rubber cap d''' , having a slit d'''' therein. The pressure of air from the pump readily opens this; but it is evident that back pressure tends to close the slit.

The spraying-tube consists of an outer tube F, which is secured to the cap-plate, and the inner tube f , arranged therein. The inner tube f projects downwardly into the receptacle to carry up the medicament, which is drawn therethrough by suction of the air as it is delivered past its tip from the outer tube F. The outer tube F is provided with a tip-piece F' , having a delivery-opening arranged in alinement with the end of the medicament-tube f . As a means of supporting the medicament-tube f the air-tube F is bored out at its outer end to a proper size to receive and retain the medicament-tube. Air-passages f' are provided, so that the air is delivered to substantially surround the tip of the medicament-tube.

When it is desired to convert the sprayer into a nasal douche, the tip F' is removed and the douche-tip f'' is substituted therefor. The liquid is delivered into the tip F' against the wall f''' , whereby its direct force is broken. The tip is curved downward, so that the liquid readily flows therefrom. The douche-tip F'' is provided with an inwardly-projecting flange f'' , which embraces the tip of the liquid-tube f , thereby preventing the delivery of the air through the air-tube F of the sprayer. This confines the air, so that the liquid is forced in a stream from the liquid-tube.

By arranging the parts of my improved instrument as I have illustrated and described the same may be very quickly adjusted for use as an atomizer or as a spraying device or as a nasal douche. It is found in practice that it is very desirable to use a douche or spray device for first washing or cleansing the parts to be treated and then applying the medicament by means of an atomizer. In some instances the douche is preferred or considered most desirable, and in others the

sprayer, and it is sometimes desirable to use both, first one and then the other. I have in my improved instrument provided a structure whereby both of these operations can be carried out. The structure is very compact, simple, and easy to adjust. By means of my improved pump a large quantity of air can be supplied with comparatively little effort. The structure is economical to produce and is not likely to get out of repair. By employing the check-valves and the chambered finger-piece for the plunger-rod a supply of air is furnished so that the spray is delivered in a continuous stream—that is, of course, when the pump is operated continuously and with reasonable speed.

If desired, the plunger may be locked in its inner position by means of the catch G, which is inserted in the nipple D' . This catch is provided with a notch at g , which engages the inner end of the nipple, thereby preventing its withdrawal, while the tension of the plunger-spring is against its outer end.

It is evident that my improved device is very convenient to use and it is very easy to manipulate.

I have illustrated and described my improved instrument in detail in the form preferred by me on account of its structural simplicity and economy, although I am aware that it is capable of considerable variation in structural details without departing from my invention.

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

1. The combination of a cap-plate, having a plurality of downwardly-projecting threaded flanges thereon; a pair of liquid-receptacles and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end so that it is open when said section is in its outer position, and closed when in its inner position; a chambered finger-piece on the outer end of said inner plunger-rod section, into which it delivers; a check-valve for the upper end of said inner plunger-rod section; an atomizer-tube arranged through said cap-plate projecting into one of said receptacles; a medicament-delivery tube for said receptacle, arranged through said cap-plate; a flexible air-delivery tube for connecting said chambered finger-piece for said plunger-rod to said atomizer-tube; a spray-tube carried by said cap-plate, projecting into the other receptacle; a nipple arranged through said cap-plate, to

which said air-delivery tube may be connected for delivering air to said second receptacle; and a valve on the inner end of said nipple, consisting of a rubber cap with a slit therein, all coacting for the purpose specified.

2. The combination of a cap-plate, having a plurality of downwardly-projecting threaded flanges thereon; a pair of liquid-receptacles and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end, so that it is open when said section is in its outer position, and closed when in its inner position; a chambered finger-piece on the outer end of said inner plunger-rod section, into which it delivers; a check-valve for the upper end of said inner plunger-rod section; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for the said receptacle, arranged through said cap-plate; a flexible air-delivery tube for connecting said chambered finger-piece for said plunger-rod to said atomizer-tube; a spray-tube carried by said cap-plate, projecting into the other receptacle; and a nipple arranged through said cap-plate to which said air-delivery tube may be connected for delivering air to the said second receptacle, for the purpose specified.

3. The combination of a cap-plate, having a plurality of downwardly-projecting threaded flanges thereon; a pair of liquid-receptacles and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end, so that it is open when said section is in its outer position, and closed when in its inner position; a chambered finger-piece on the outer end of said inner plunger-rod section, into which it delivers; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for the said receptacle arranged through said cap-plate; a flexible air-delivery tube for connecting said chambered finger-piece for said plunger-rod to said atomizer-tube; a spray-tube carried by said cap-plate, projecting into the other receptacle; a nipple arranged through said cap-plate to which said air-delivery tube may be connected for

delivering air to the said second receptacle; and a valve on the inner end of said nipple, consisting of a rubber cap with a slit therein; all coacting for the purpose specified.

4. The combination of a cap-plate, having a plurality of downwardly-projecting threaded flanges thereon; a pair of liquid-receptacles and a pump-cylinder threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end, so that it is open when said section is in its outer position, and closed when in its inner position; a chambered finger-piece on the outer end of said inner plunger-rod section, into which it delivers; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for the said receptacle, arranged through said cap-plate; a flexible air-delivery tube for connecting said chambered finger-piece for said plunger-rod to said atomizer-tube; a spray-tube carried by said cap-plate, projecting into the other receptacle; and a nipple arranged through said cap-plate to which said air-delivery tube may be connected for delivering air to the said second receptacle, all coacting for the purpose specified.

5. The combination of a cap-plate, having a plurality of downwardly-projecting threaded flanges thereon; a pair of liquid-receptacles and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end so that it is open when said section is in its outer position, and closed when in its inner position; a check-valve for the upper end of said inner plunger-rod section; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for the said receptacle arranged through said cap-plate; a spray-tube carried by said cap-plate, projecting into the other receptacle; a nipple opening into said second receptacle; and a flexible air-delivery tube for connecting said outer plunger-rod section to said atomizer-tube or to said nipple, as may be desired, for the purpose specified.

6. The combination of a cap-plate, having a plurality of downwardly-projecting threaded flanges thereon; a pair of liquid recep-

tacles and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end so that it is open when said section is in its outer position, and closed when in its inner position; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for the said receptacle arranged through said cap-plate; a spray-tube carried by said cap-plate, projecting into the other receptacle; a nipple opening into said second receptacle; and a flexible air-delivery tube for connecting said outer plunger-rod section to said atomizer-tube or to said nipple, as may be desired, for the purpose specified.

7. The combination of a cap-plate, having a plurality of downwardly-projecting threaded flanges thereon; a pair of liquid-receptacles and a pump-cylinder threaded onto said flanges of said plate; a plunger; a tubular plunger-rod opening through said plunger; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for the said receptacle-tube arranged through said cap-plate; a spray-tube carried by said cap-plate, projecting into the other receptacle; a nipple opening into said second receptacle; and a flexible air-delivery tube for connecting said outer plunger-rod to said atomizer-tube, or to said nipple, as may be desired, for the purpose specified.

8. The combination of a cap-plate, having a plurality of downwardly-projecting threaded flanges thereon; a pair of liquid-receptacles and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a tubular plunger-rod opening through said plunger; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for the said receptacle-tube arranged through said cap-plate; a spray-tube carried by said cap-plate, projecting into the other receptacle; and a flexible air-delivery tube for connecting said outer plunger-rod to said atomizer-tube, or to said second receptacle, as may be desired, for the purpose specified.

9. The combination of a pair of liquid-receptacles and a pump-cylinder connected together; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner

plunger-rod section having an inlet-port arranged at its outer end so that it is open when said section is in its outer position, and closed when in its inner position; a check-valve for the upper end of said inner plunger-rod section; a chambered finger-piece on the outer end of said inner plunger-rod section, into which it delivers; an atomizing device for one of said receptacles; and a spray device for the other; and a flexible air-delivery tube for connecting said chambered finger-piece of said outer plunger-rod section to either of said devices as desired, for the purpose specified.

10. The combination of a pair of liquid-receptacles and a pump-cylinder, connected together; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end so that it is open when said section is in its outer position, and closed when in its inner position; a chambered finger-piece on the outer end of said inner plunger-rod section, into which it delivers; an atomizing device for one of said receptacles, and a spray device for the other; and a flexible air-delivery tube for connecting said chambered finger-piece of said outer plunger-rod section to either of said devices as desired, for the purpose specified.

11. The combination of a pair of liquid-receptacles and a pump-cylinder, connected together; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end so that it is open when said section is in its outer position, and closed when in its inner position; a check-valve for the upper end of said inner plunger-rod section; an atomizing device for one of said receptacles, and a spray device for the other; and a flexible air-delivery tube for connecting said outer plunger-rod section to either of said devices, as desired, for the purpose specified.

12. The combination of a pair of liquid-receptacles and a pump-cylinder connected together; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port arranged at its outer end so that it is open when

said section is in its outer position, and closed when in its inner position; an atomizing device for one of said receptacles, and a spray device for the other; and a flexible air-delivery tube for connecting said outer plunger-rod section to either of said devices as desired, for the purpose specified.

13. The combination of a pair of liquid-receptacles and a pump-cylinder connected together; a plunger; a tubular rod therefor, opening through said plunger; an atomizing device for one of said receptacles, and a spray device for the other; and a flexible air-delivery tube for connecting said plunger-rod to either of said devices as desired, for the purpose specified.

14. The combination of a pair of liquid-receptacles and a pump connected together; an atomizing device for one of said receptacles, and a spray device for the other; and means for connecting either of said devices to said pump, as desired, for the purpose specified.

15. The combination of a cap-plate, having downwardly-projecting threaded flanges thereon; a liquid-receptacle and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port at its outer end arranged so that it is open when said section is in its outer position and closed when in its inner position; a chambered finger-piece on the outer end of said inner plunger-rod section, into which it delivers; a check-valve for the upper end of said inner plunger-rod section; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for said receptacle, arranged through said cap-plate; and a flexible air-delivery tube for connecting said chambered finger-piece for said plunger-rod to said atomizer-tube, for the purpose specified.

16. The combination of a cap-plate, having downwardly-projecting threaded flanges thereon; a liquid-receptacle and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port at its outer end arranged so that it is open when said section is in its outer position and closed when in its inner position; a chambered finger-piece on the outer end of said inner plunger-rod section, into which it delivers; an

atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for said receptacle arranged through said cap-plate; and a flexible air-delivery tube for connecting said chambered finger-piece for said plunger-rod to said atomizer-tube, for the purpose specified.

17. The combination of a cap-plate; having downwardly-projecting threaded flanges thereon; a liquid-receptacle and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port at its outer end arranged so that it is open when said section is in its outer position, and closed when in its inner position; a check-valve for the upper end of said inner plunger-rod section; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for said receptacle arranged through said cap-plate; and a flexible air-delivery tube for connecting said plunger-rod to said atomizer-tube, for the purpose specified.

18. The combination of a cap-plate, having downwardly-projecting threaded flanges thereon; a liquid-receptacle and a pump-cylinder, threaded onto said flanges of said plate; a plunger; a rod therefor, consisting of a pair of tubular telescoping sections, the outer of which is secured to said plunger and opens through the same; a spring for holding said plunger normally upward in said pump-cylinder; a spring for holding the inner plunger-rod section normally outward, said inner plunger-rod section having an inlet-port at its outer end arranged so that it is open when said section is in its outer position, and closed when in its inner position; an atomizer-tube arranged through said cap-plate, projecting into one of said receptacles; a medicament-delivery tube for said receptacle arranged through said cap-plate; and a flexible air-delivery tube for connecting said plunger-rod to said atomizer-tube, for the purpose specified.

19. The combination of a liquid-receptacle and a pump-cylinder connected together; a plunger; a tubular rod opening through said plunger; a spring for holding said plunger normally upward in said pump-cylinder; and an atomizing device; and a flexible air-delivery tube for connecting said plunger-rod to said atomizing device, for the purpose specified.

20. The combination of a spraying device, consisting of an outer air-tube, a liquid-tube arranged within the same, and a detachable

spray-tip; and a nasal douche-tip adapted to be substituted for said spray-tip and arranged to seal the delivery-opening of said air-tube, said douche-tip having a portion in
5 its upper part against which the liquid is delivered from said liquid-tube, for the purpose specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

FRANK C. DORMENT. [l. s.]

Witnesses:

FRED L. CHAPPELL,
D. E. WOOD.