

J. N. McKIM.

## INHALER.

APPLICATION FILED SEPT. 6, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

**FIG. 1.**

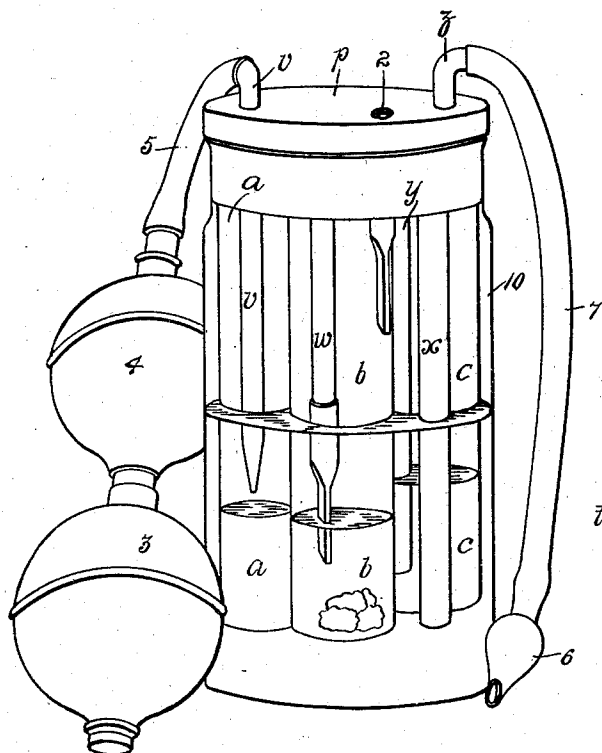


FIG. 4.

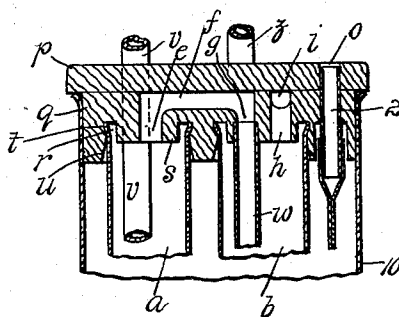


FIG. 2.

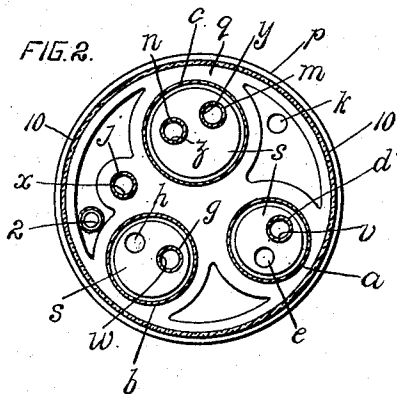
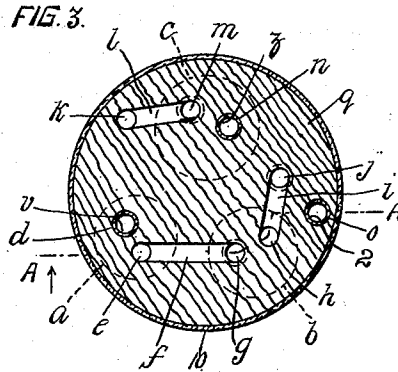


FIG. 3.



Witnesses

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No. 743,018.

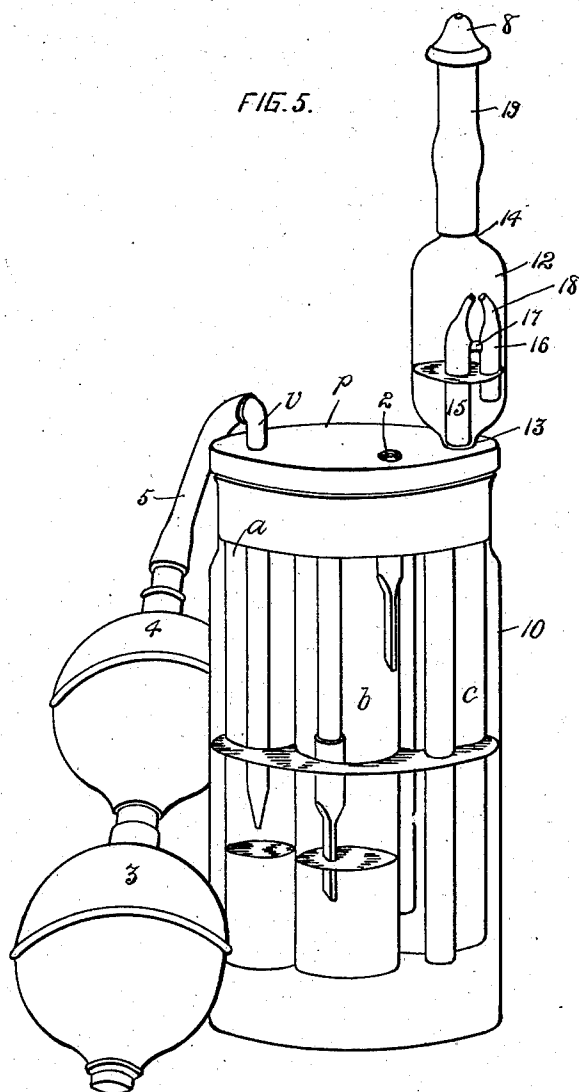
PATENTED NOV. 3, 1903.

J. N. McKIM.  
INHALER.

APPLICATION FILED SEPT. 6, 1902.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses

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## UNITED STATES PATENT OFFICE.

JOHN NELSON MCKIM, OF MONTREAL, CANADA.

## INHALER.

SPECIFICATION forming part of Letters Patent No. 742,918, dated November 3, 1903.

Application filed September 6, 1902. Serial No. 122,436. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN NELSON MCKIM, of the city of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Inhalers; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to inhalers wherein a series of receptacles are employed; and it has for its objects, first, to enable communication to be effected between various receptacles without the means of communication being exposed; secondly, to adapt the cork to be carried by or carry and render air-tight the open ends of said chemical-tubes, and, thirdly, to adapt the device to cause an expectorant and a healing drug or mixture to be simultaneously emitted therefrom.

To this end the invention may be said briefly to consist in constructing a cork with a series of channels or ducts in the interior of its substance and extending parallel to its surface and having their ends turned and leading through one surface thereof and adapted to communicate with a series of bottles, while said cork is further adapted to receive the open ends of and carry said bottles and at the same time render the connection therebetween and the cork air-tight. The bottles are of different diameter, as are also a series of sockets or recesses in the cork for receiving them, and one of the bottles (there being three in number) constitutes a receptacle for any prescribed medicine, while the others receive, respectively, an acid and an alkali, the chemical combination of which will form an expectorant.

For full comprehension, however, of my invention reference must be had to the accompanying drawings, in which like symbols indicate the same parts, and wherein—

Figure 1 is a perspective view of an inhaler constructed according to my invention. Fig. 2 is a plan view of the inside of my improved cork. Fig. 3 is a horizontal sectional view of my improved cork, illustrating particularly the ducts through the substance thereof. Fig. 4 is a transverse vertical sectional view taken on line A A, Fig. 3; and Fig. 5 is a similar view to Fig. 1, but illustrating a modification of the medicine-receptacle.

The carrying-cup 10 may be of any preferred construction, and the same can be said of the bottles *a*, *b*, and *c*.

The improved cork, in which my invention mainly resides, is formed with a series of transverse or axial perforations, of which *d* extends completely therethrough and *e*, *g*, *h*, *j*, *k*, and *m* extend partially therethrough from the lower surface, and *n* and *o*, like *d*, extend completely therethrough. The perforations *e*, *g*, *h*, *j*, *k*, and *m* are connected together in pairs by ducts *f*, *i*, and *l*, extending parallel to and between the surfaces of the cork.

My improved cork is preferably made of soft rubber and in two sections *p* and *q* to facilitate construction, said sections being secured together with cement to form an integral whole.

In order to enable the bottles to be carried and each capped by my improved cork, I form the under side of the latter with a series of circular recesses *r*, each encircling a pair of the perforations and into each of which a boss *s*, integral with the cork, projects. These bottles are formed with annular flanges *t* at their upper ends, which are seated in annular extensions of the upper ends of said recesses, thus preventing the dropping of the bottles from place, while the recesses are slightly flared, as at *u*, to facilitate the insertion of the bottles.

The upper ends of the tubes are carried by the cork, the tube *v* extending completely through perforation *d* therein and into the bottle *a*, the tube *w* having its upper end inserted in perforation *g* and projecting into tube *b*, the tube *x* being inserted into perforation *j* and projecting into the carrying-cup 10, and the tube *y*, having its upper end inserted into perforation *m*, projects into the tube *c*, while a short tube *z* projects completely through perforation *n* in the cork and into the tube *c* a short distance below the cork, and a second short tube 2 projects through perforation *o* into the carrying-cup a short distance below the cork.

The carrying-cup carries water, as usual.

The lower end of the tube *v* is diminished to give resistance to the reservoir-bulb and maintain a continuous flow of air.

My improved inhaler is intended for supplying an inhalant comprising expectorant

and healing and antiseptic properties, and to this end I charge the bottles *a* and *b* with an acid and an alkali, respectively, the chemical union whereof produces the expectorant, and the bottle *c* is charged with the healing and antiseptic medicine.

By the arrangement just described air forced from the bulbs will pass in sequence through the chemical and medicine bottles, tubes, and interior channels of my improved cork, and a vapor will be emitted ladened with minute particles of the expectorant, each coated with the medicine.

The expectorant I prefer to use consists of ammonium chlorid formed by the chemical union of hydrochloric acid, with which bottle *a* is charged, and ammonia in bottle *b*, (although other ingredients may be used without departing from the spirit of my invention,) and the healing substance in tube *c* will depend upon the disease to be treated and the physician's prescription.

A compressible bulb 3 and a storage-bulb 4 are connected to the upper end of tube *v* by a flexible length of tubing 5, and an inhaling-tip 6 is connected to the upper end of tube *z* by a flexible length 7.

A pair of valves are carried upon the lower ends of tubes *w* and 2, respectively, and consist, preferably, of flexible tubing cured flat.

The valve upon the tube 2 is to prevent a vacuum being formed in the carrying-cup while the cork is being removed, and the valve on the tubular duct *w* prevents the mingling of the gases and the resultant blocking of the duct with ammonium chlorid when the inhaler is not in use.

Under certain conditions—as, for instance, when it is desired to combine with the expectorant a medicine of a non-volatile character—it has been found that said non-volatile medicine will not be carried in sufficient quantities to be of therapeutic value, and to enable it to be administered with the expectorant I have provided as a modification a nebulizer of peculiar construction, which I substitute for the short tube *z*, and charge said nebulizer with the non-volatile medicine, which would otherwise have been put in tube *c*, while the latter is then preferably charged with a moisture-absorbing substance—such, for instance, as charcoal, (not shown)—or left empty. This nebulizer consists of a drug-receptacle 12, preferably of cylindrical form and made of glass and having its ends diminished, as at 13 and 14. The diminished end 13 has a tube 15 of diminutive bore welded, cemented, or otherwise secured therein, with one end projecting into the receptacle to about its middle and diminished and bent to project toward the wall of the receptacle at an angle of about forty-five degrees. A drawing-tube 16 of diminutive bore is secured, preferably, by a bridge-piece 17 to the tube 15 (or it may be otherwise supported) and has one end located near the bottom of the receptacle and its other end diminished, as

at 18, and located in a position relatively to tube 15, such as shown in Fig. 5. The tip 8 (whether a nasal tip, as shown, an eustachian-catheter tip, or any other form) is secured upon the tube 14 by means of a soft-rubber coupling-tube 19, stretched over the latter.

The prime function of my improved nebulizer is to produce a vapor or nebula so fine as to readily float on the atmosphere and therefore be particularly adapted to inhalation owing to the fact that the floating particles of the vapor or nebula will remain in its vapor or nebular state for sufficient time to allow it to pass through the nasal and bronchial passages and be carried to every point within the lungs with which air may come in contact.

When in use, the vapor or nebula from the nozzles of tubes 15 and 16 first impinge upon the wall of the receptacle before flowing through the tip, from which (when a nasal tip with its comparatively large orifice is used) only the very small particles are projected in the form of a very fine vapor or nebula, which upon being inhaled will not be quickly precipitated, but will be drawn well into the lungs, as above pointed out, or if the eustachian-catheter tip is used the vapor or nebula will be directed upon any affected point or spot.

When the substance to be vaporized or nebulized impinges upon the wall of the receptacle, it is in the form of spray, and this impingement thereof causes the particles of the substance to be further broken, forming a vapor or nebula. The course will then be deflected by the diminishment of the end of the receptacle and as it turns any comparatively large globules separate themselves from the vapor or nebula and return to the lower portion of the receptacle. The shoulder 20, adjacent to the exit end, is particularly adapted to deflect these comparatively large globules and return them to the receptacle, while the cylindrical form of the latter is easily constructed and at a comparatively low cost and renders the complete nebulizer compact.

My improved construction of cork or cover obviates any chance of an interruption or misplacing of the communication-ducts, owing to said communication-ducts being formed in the interior of the substance of the cork. Heretofore these communication-ducts have projected above the top of the cork and have been liable to breakage when in place or misplacement when being assembled. A further advantage of my improved construction is that the appearance of the inhaler to which it is applied is improved.

It will be observed by reference particularly to Fig. 2 that the bottles are of different sizes, as are also the recesses which receive them. This prevents their being inserted in the wrong sequence.

What I claim is as follows:

1. The combination with two or more receptacles, having tubular ducts communicating

therewith, of a cork or cover having one or more inclosed ducts or channels extending longitudinally through the body of the cork and each having its ends turned down to receive, and effect a communication between the ducts of said two or more receptacles, substantially as described and for the purpose set forth.

2. The combination with two or more receptacles, having tubular ducts communicating therewith, of a cork or cover consisting of a body portion and a capping portion the body portion having one or more ducts or channels extending longitudinally through the body of the cork which partially incloses same and each having its ends turned down to effect a communication between the said two or more receptacles and said capping portion completing the inclosure of said ducts or channels, substantially as described and for the purpose set forth.

3. A cork or cover having one or more inclosed ducts or channels extending longitudinally through the body of the cork and each having its ends turned down to receive, and effect a communication between ducts of said two or more receptacles, substantially as described and for the purpose set forth.

4. A cork or cover consisting of a body portion and a capping portion, the body portion having one or more ducts or channels extending longitudinally through the body of the cork which partially incloses same and each having its ends turned down to receive, and effect a communication between, the ducts of said two or more receptacles and said capping portions completing the inclosure of said ducts or channels, substantially as described and for the purpose set forth.

5. The combination with a series of bottles, and a carrying-cup encircling said bottles of a cork corking said carrying-cup and having a series of recesses in its under side to receive and cap said bottles, and a series of inclosed ducts or channels extending longitudinally through the body of the cork and having their ends turned down and effecting a communication between the said bottles and carrying-cup in series, substantially as described and for the purpose set forth.

6. In an inhaler the combination with a series of bottles, and a carrying-cup encircling said bottles, of a cork corking said carrying-cup and having a series of recesses in its under side to receive and cap said bottles said cork having a series of inclosed ducts or channels extending longitudinally through the body thereof and each having its ends turned down and effecting a communication between the said bottles and a carrying-cup in series, and a series of perforated bosses integral with said cork with their perforations in line with the ends of said ducts or channels, substantially as described and for the purpose set forth.

7. In an inhaler the combination with a series of bottles of different diameters, and a carrying-cup encircling said bottles, of a cork corking said carrying-cup and having a series of recesses of different diameters in its under side to receive and cap said bottles said cork having a series of inclosed ducts or channels extending longitudinally through the body thereof and each having its ends turned down and effecting a communication between the said bottles and a carrying-cup in series, and a series of perforated bosses integral with said cork with their perforations in line with the ends of said ducts or channels, substantially as described and for the purpose set forth.

8. In an inhaler the combination with bottles for containing chemicals, a receptacle for containing a washing liquid, and tubes effecting a communication between said bottles and receptacles in sequence, of a bottle in series with said chemical-bottles and receptacle for drying the gaseous substance flowing through said circuit, substantially as described and for the purpose set forth.

9. In an inhaler comprising a carrying-cup and a series of bottles, the combination with said cup and bottles, of a cover acting as a cork closing said carrying-cup, and carrying and acting as a cork for said bottles.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN NELSON McKIM.

Witnesses:

WILLIAM P. McFEAT,  
FRED. J. SEARS.