H. A. KAYSAN.

NOZZLE FOR SYRINGES AND THE LIKE.

APPLICATION FILED JAN. 11, 1907.

908,573.

Patented Jan. 5, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

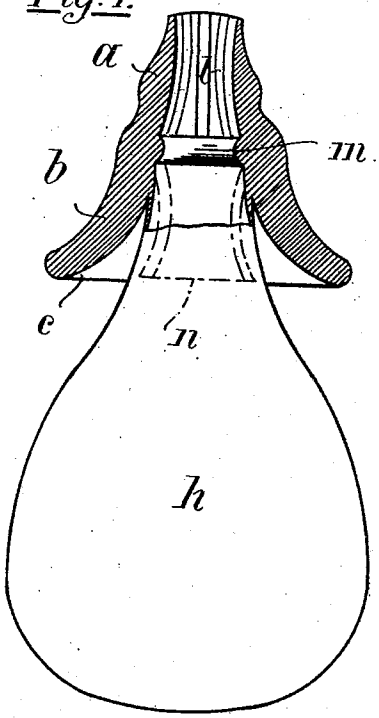


Fig. 3.

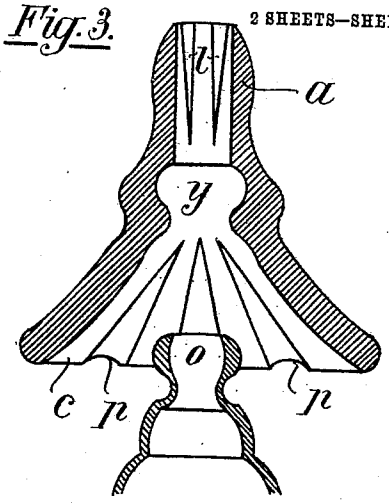


Fig. 4.

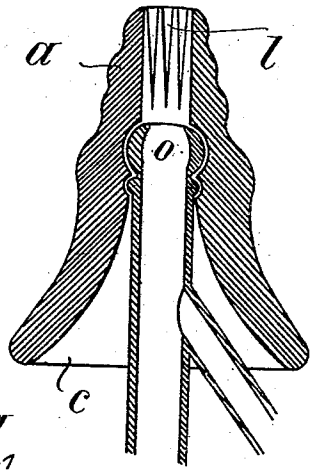


Fig. 2.

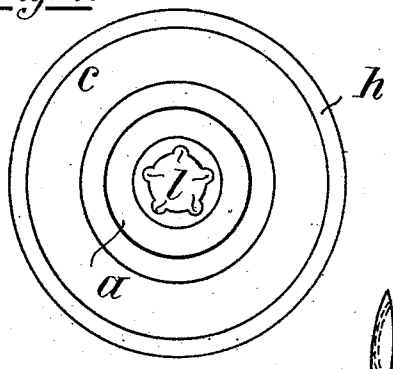
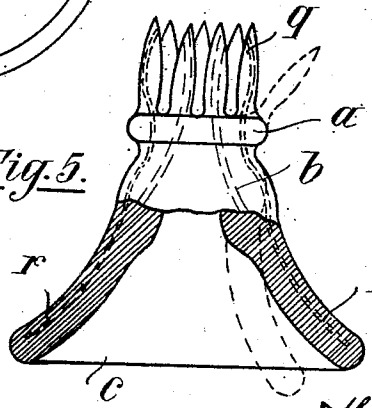


Fig. 5.



Attest

C. F. Keeyman

Wm. L. Howell

Inventor

Heinrich A. Kaysan

by William F. Hall

his atty.

THE NORRIS PETERS CO., WASHINGTON, D. C.

H. A. KAYSAN.

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2 SHEETS—SHEET 2.

Fig. 6.

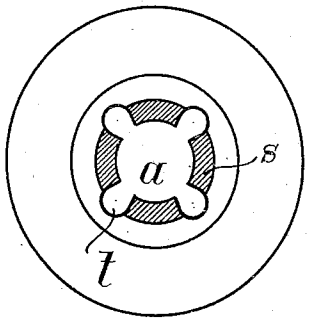


Fig. 7.

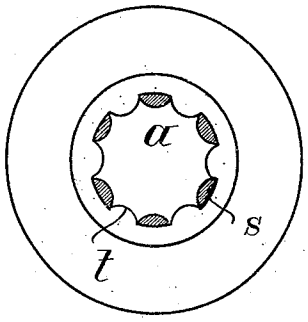


Fig. 8.

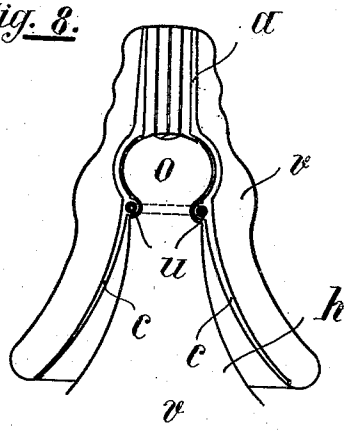


Fig. 10.

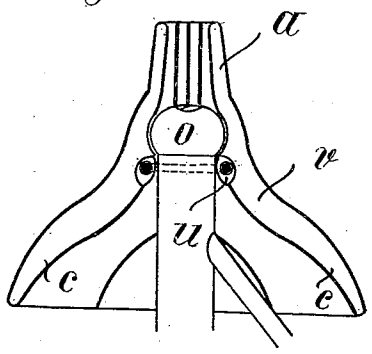


Fig. 9.

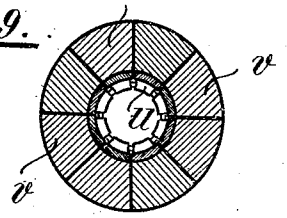


Fig. 11.

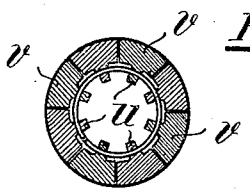
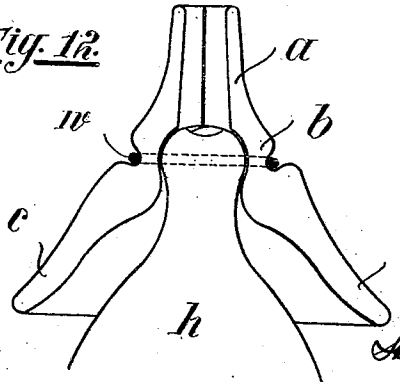


Fig. 12.



Witnesses

E. B. Heylmun

Wm. V. Hawell

Inventor

Heinrich A. Kaysan

by William F. Hall

his atty

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HEINRICH AUGUST KAYSAN, OF CASSEL, GERMANY.

NOZZLE FOR SYRINGES AND THE LIKE.

No. 908,573. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed January 11, 1907. Serial No. 351,775.

To all whom it may concern:

Be it known that I, HEINRICH AUGUST KAYSAN, a subject of the Emperor of Germany, residing at Cassel, in the Empire of Germany, have invented certain new and useful Improvements in Nozzles for Syringes and the Like, of which the following is a specification.

My invention relates to nozzles for syringes, irrigators, and the like, and its object is to provide a nozzle so constructed that the front end of the same may be expanded upon the rear end of the nozzle being compressed.

The invention includes a nozzle proper having an expansible cone or forward end, a rear flaring part or collar, and an intermediate part serving as a fulcrum.

The invention is susceptible of embodiment in various forms and in order to demonstrate its adaptability I have illustrated and shall hereinafter describe several exemplifications thereof.

In these drawings Figure 1 is a sectional view of a one-piece nozzle embodying my invention, the nozzle being shown associated with a bulb with which it may form a one-piece structure. Fig. 2 is an end view of the same. Fig. 3 is a sectional view of a modification. Fig. 4 is a similar view of another modification. Fig. 5 is an elevation partly in section of another embodiment of the invention. Figs. 6 and 7 are cross sectional views of other modified forms and Figs. 8 to 12 are views of other forms.

The invention comprises, generally, a nozzle proper having a central discharge opening; a flaring rearward end forming a skirt or collar adapted to bear against the orifice into which the nozzle is inserted and to be compressed thereby, and a front part or cone adapted to be expanded upon the contraction of the collar or skirt; the expansible part or cone constituting the wall of the discharge opening.

In the accompanying drawings, the nozzle, as an entirety, is designated *b*, the forward expansible part or cone *a*, and the skirt or collar *c*. As shown herein, the skirt or collar flares outwardly away from the bulb or other liquid supply device with which the nozzle is associated, thus providing an annular recess which admits of the skirt or collar being compressed or forced inwardly.

In Fig. 1, the nozzle is illustrated in full lines as integral with a bulb *h* but it will be understood that the nozzle may be provided with a neck *n*, as indicated by dotted lines, to which the end of the bulb would be secured.

As will be seen, the collar or skirt is made hollow, so that on the nozzle being introduced into the orifice to be treated it will be contracted, while at the same time it will act so to say as a lever for expanding the cone *a*. This will be clear when bearing in mind, that the middle part *b* will contract much less, so that the external layer of the cone *a* will be pulled outwards by the external layer of the collar *c*. Thereby the external surface of the nozzle will be caused to bear on the insides of the respective orifice and thus to close the passage from the cavity. Where so preferred, several longitudinal grooves *l* may be provided in the said central opening, whereby the cone *a* is on the respective places weakened to facilitate its expansion. An internal annular projection *m* may be provided for stiffening the middle part of the nozzle, so that the cone *a* may be better expanded.

Figs. 3 and 4 each illustrate a similar separate nozzle, which however is provided with a cavity *y* into which the stiff neck *o* of a syringe or a tube therewith connected can be introduced. This nozzle may be provided with grooves *p* on the inside of its collar *c*, as is shown in Fig. 3, so as to enable the collar *c* to better contract. The neck *o* will then serve so to say as a fulcrum, about which the collar *c* turns inwards and the cone *a* outwards.

The cone *a* was hitherto assumed to be simple, but it may be given various shapes according to the purposes for which the syringe or the like is intended. For example the cone *a* may be provided with teeth *q* so as to form a sort of crown as shown in Fig. 5, so that these teeth *q* may be turned outwards much more than the cone *a* shown in Figs. 1 to 4 on the collar *c* being compressed. To further the said purpose, the nozzle may be provided with several longitudinal bars *r* embedded in it, these bars being made from a convenient material and being suitably bent, so as to stiffen the teeth of the crown *q* and to better turn them outwards on the collar *c* being compressed, as is indicated by the dotted lines in Fig. 5. If so preferred, the thicker middle part *b* may be weakened by several internal longitudinal grooves to attain the said object. The cone *a* may also consist of several longitudinal teeth *s* and of as many flexible parts or wings *t* between them, as is shown in

Figs. 6 and 7. These wings *t* may be bent outwards as in Fig. 6 or inwards as in Fig. 7. Thereby the teeth *s* are permitted to radially turn within wide limits. The cone *a* may also be composed of several segmental parts *v* which at their fulcrums are united by means of a brace, a wire or the like. For this purpose the several segmental parts *v* are provided with eyes *u*, which may project as in Figs. 8 and 9, or may be disposed in recesses as in Figs. 10 and 11. They may be made of a harder material than the cones, for example ebonite, celluloid and the like, whereas soft india rubber will be found most suitable for the cones, they being in certain cases strengthened with inclosures for organs which are less sensitive. The segmental parts *v* according to Fig. 12 are combined by means of a wire *w* or an india rubber lace or the like placed round them in recesses. Where so preferred each segmental part *v* of the cone *a* may be composed of a base of a harder material and of a coat of a softer material as is indicated in Figs. 8 and 9.

The nozzle described may be connected with the liquid reservoirs either direct as in vaginal syringes or by means of connections (hoses and the like) as in irrigators.

I claim:

1. The combination with a liquid supply member, of a nozzle associated therewith provided with a central opening or bore, said nozzle having an expansible end or cone forming the wall of the opening, an outwardly flaring opposite end or skirt with an annular space between the same and the supply member, and an intermediate part serving as a fulcrum whereby when the skirt is compressed the cone will be expanded.

2. A syringe nozzle comprising a substantially conical member formed of flexible elastic material, and comprising an expansible nozzle portion at its outlet end and a compressible skirt portion, said nozzle and skirt portion being integral and means whereby the compression of said skirt portion operates to expand the nozzle portion.

3. A syringe-nozzle of flexible material and comprising a cone weakened by longitudinal grooves at the one end, a hollow collar at the other end, a neck adjacent to said collar and adapted to receive the mouth of the orifice to be treated, and an internal annular stiffening projection, said collar being adapted on being compressed by the orifice to spread said cone.

4. In a syringe, the combination with a nozzle of flexible material and having a cone at the one end, a hollow collar at the other end, and a neck adjacent to said collar and adapted to receive the mouth of the orifice to be treated, of a compressible liquid reservoir connected with the other end of said nozzle, the collar of said nozzle being adapted on being compressed by the orifice to spread its cone.

5. In a syringe, the combination with a nozzle of flexible material and having a cone weakened by longitudinal grooves at the one end, a hollow collar at the other end, a neck adjacent to said collar and adapted to receive the mouth of the orifice to be treated, and an internal annular stiffening projection, of a compressible liquid reservoir connected with the other end of said nozzle, the collar of said nozzle being adapted on being compressed by the orifice to spread its cone.

6. A syringe-nozzle of flexible material and comprising a cone weakened by longitudinal grooves at the one end, a hollow collar weakened by longitudinal grooves at the other end, a neck adjacent to said collar and adapted to receive the mouth of the orifice to be treated, and an internal annular stiffening projection, said collar being adapted on being compressed by the orifice to spread said cone.

7. A syringe-nozzle of flexible material and comprising a cone at the one end, a hollow collar at the other end, and a neck adjacent to said collar and adapted to receive the mouth of the orifice to be treated, said cone consisting of a plurality of less flexible longitudinal ribs and a plurality of more flexible membranes alternating therewith, and said collar being adapted on being compressed by the orifice to spread said cone.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH AUGUST KAYSAN.

Witnesses:

PAUL SCHMIDT,

ROWL PAVEL.