

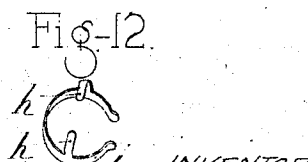
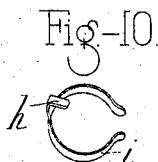
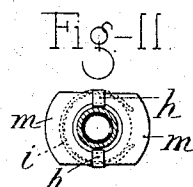
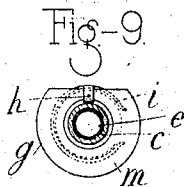
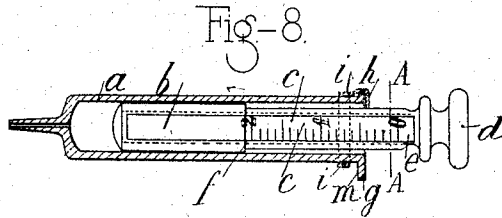
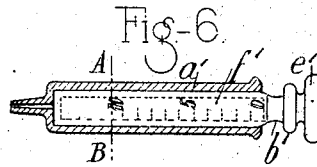
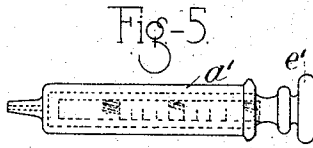
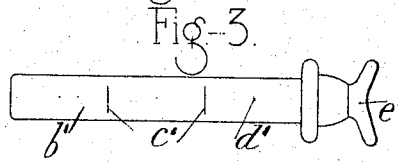
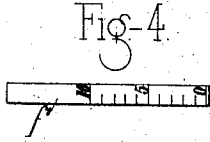
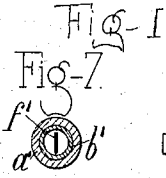
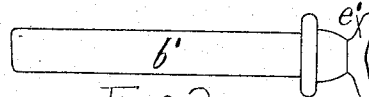
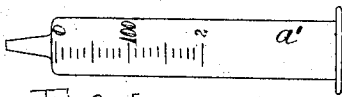
No. 772,450.

PATENTED OCT. 18, 1904.

H. A. WULFING-LÜER.  
ASEPTIC SYRINGE.

APPLICATION FILED APR. 19, 1904.

NO MODEL.



WITNESSES

*H. A. Kuehn*  
*John A. Percival*

INVENTOR

*Hermann Alois Wulffing-Lüer*

*Richard R.*

ATTORNEYS

## UNITED STATES PATENT OFFICE.

HERMAN ADOLPHE WULFING-LÜER, OF PARIS, FRANCE.

## ASEPTIC SYRINGE.

SPECIFICATION forming part of Letters Patent No. 772,450, dated October 18, 1904.

Application filed April 19, 1904. Serial No. 203,906. (No model.)

*To all whom it may concern:*

Be it known that I, HERMAN ADOLPHE WULFING-LÜER, of No. 6 Rue Antoine-Dubois, Paris, France, have invented certain new and useful Improvements in Aseptic Syringes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in syringes made entirely of crystalline material, such as glass—that is to say, without any kind of extra fittings. These syringes consist of the body of the syringe made of glass smooth on its interior surface and containing a plunger, also made of glass and smooth on its exterior surface. At present the graduating of such a syringe is done by means of lines traced by acid on the exterior surface of the body of the syringe, the plunger of such a syringe being entirely free from graduations. In order to sterilize the syringe before each injection, it is necessary to plunge it into water and bring this to a boiling-point, the result being that after a few operations the graduations become effaced and impossible to read, or at any rate the reading being made very difficult. The improvements I have made remedy this inconvenience.

The invention consists in principle in providing the plunger of the syringe with an additional graduation and in limiting the stroke of the plunger by means of a simple arrangement easily fitted onto the body of the syringe.

In the accompanying drawings, Figure 1 is an elevation of a syringe having the graduations applied in the old way. Fig. 2 is a view of the plunger therefor. Fig. 3 is a view of the plunger having the graduations applied thereto according to this invention. Fig. 4 is a view of the graduated plate. Fig. 5 is an elevation of the syringe with the plunger therein. Fig. 6 is a longitudinal section. Fig. 7 is a transverse section on line A B of Fig. 6. Fig. 8 is a longitudinal sectional elevation of the complete syringe having attached thereto a device for limiting the stroke of the plunger. Fig. 9 is a transverse section through A A, Fig. 8. Fig. 10 is a view in perspective of a collar having a stop thereon. Fig. 11 is a

transverse section corresponding to that of Fig. 9, showing a modified form of collar. Fig. 12 is a perspective view of the collar shown by Fig. 11.

The graduation is effected, as is shown in Fig. 3 of the drawing, by means of small and very fine grooves *c'*, made in the glass of the plunger *b* or by simple points or depressions *d'* on the surface. The graduation of the plunger instead of being marked on its exterior surface may preferably be situated on the interior surface. One of the most practical ways consists in inserting within the hollow before heating and sealing the stem to the operating-button *e'* or before the stem is closed at its front end a small plate *f'*, Fig. 4, made of aluminium, for example, colored or otherwise and which is clearly graduated. The small plate *f'* is, it must be understood, fixed in such a way that the zero of its graduation will be situated in line with the enlarged end of the body of the syringe *a'* when the plunger is thrust to the bottom of the syringe, so that in order to read the volume of liquid admitted, whatever position the plunger may occupy, it will be necessary only to read the graduation-mark which stands opposite the edge of the extremity of the body of the syringe. The small inner plate in all cases makes the extremity of the plunger more clearly visible when the syringe is charged with liquid. The use of such a plate inserted in the plunger enables the exterior graduations of the body of the syringe and of the plunger itself to be omitted.

Figs. 8 to 12 show more particularly the arrangement which limits the length of the stroke of a plunger made entirely of glass. In all these various figures, *a* is the body of the syringe, made entirely of glass and smooth on its interior surface. Within the body of this syringe is a hollow glass plunger of two diameters *b c*. The exterior diameter of the front part *b* of the plunger fits the interior diameter of the body of the syringe. The diameter of the part *c* is smaller. There is thus a slight projection at *f* at the junction of the diameter *b* with the diameter *c*. The plunger is hollow, at any rate in the portion having the smaller diameter, and within it is placed

before it is closed by the glass head *d* a scale marked on a straight or bent plate *e*, made of porcelain, aluminium, celluloid, or any other suitable material. The head *g* of the body of the syringe is suitably notched for the passage of or for holding in position the projection *h*, carried by an open metallic collar *i*. When this collar (shown in perspective in Fig. 10) is placed in position on the body of the syringe, the projection *h* projects inward in such a way that its extremity forms an abutment for the projection *f*. In other words, the outward movement of the larger-diameter portion *b* of the plunger will be stopped by the projection *h*, and thus prevent the syringe from being filled beyond the maximum of the graduation and especially prevent a length of stroke of the plunger sufficient to cause the entrance of air.

The head of the body of the syringe may be doubly notched, as is shown in Fig. 11, for the adaptation of two projections formed on a collar such as is shown in Fig. 12. It goes without saying that the spurs or projections on the collar may be more numerous still, it being only necessary to make the head of the syringe of suitable shape. It is sufficient in

all cases for this end or head to have one or more enlarged portions or flanges *m* in order to retain the collar *i* in place.

I claim—

1. A syringe having a hollow plunger and means in the interior of the plunger carrying graduations.

2. A syringe having a hollow plunger and a plate in said plunger having graduations thereon.

3. A syringe having a plunger formed with two diameters, the body of said syringe having flanged portions formed on its head, a collar having a projection thereon, said collar being held on the syringe by said flanged portion and the said flanged portions having a notch formed therein in which the projection of the collar fits so as to form a stop for the large diameter of the plunger.

In testimony whereof I have hereunto set my hand at Paris, this 7th day of April, 1904, in the presence of two subscribing witnesses.

HERMAN ADOLPHE WULFING-LÜER.

Witnesses:

LOUIS GARDET,  
HANSON C. CORCE.