

G. OTTO.  
SYRINGE.

Patented Mar. 4, 1890.

A diagram of a circular structure, likely a cross-section of a biological specimen. It features several concentric rings. The outermost ring is labeled 'A'. Inside it is a ring with diagonal hatching, labeled 'B' on the right. The next ring inward is labeled 'C'. The center consists of a small circle with vertical hatching, labeled 'H', and a larger circle with horizontal hatching, labeled 'J'. Other labels include 'I' on the left, 'E' on the bottom right, and 'K' at the top and bottom, indicating vertical alignment.

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# UNITED STATES PATENT OFFICE.

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## SYRINGE.

SPECIFICATION forming part of Letters Patent No. 422,437, dated March 4, 1890.

Application filed December 13, 1889. Serial No. 333,587. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAV OTTO, a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Syringes, of which the following is a specification, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to hypodermic and other syringes; and it consists in the improvements hereinafter more fully set forth.

In the drawings, Figure 1 is a longitudinal section of my improved syringe, taken on the line *k k*, Fig. 2. Fig. 2 is a cross-section of the same through the line *c c*, Fig. 1. Fig. 3 is a detailed side view of a modified form of my improved piston for syringes; Fig. 4, a longitudinal section of the same; and Fig. 5, a cross-section through the line *c' c'*, Fig. 4.

Similar letters refer to similar parts throughout the several views.

A is the cylinder of a hypodermic or other syringe, which, if of glass, is held in a case B, which is usually partially cut away to expose a portion of the glass cylinder.

D is the cap fitted to the upper end, and E a cap fitted to the lower or discharge end of the case B. These caps are provided with perforated washers F G, of leather or other suitable material, for the purpose of maintaining an air-tight joint at these points. The cap D is perforated to admit of the tube H, which embraces the rod K, both carrying the plunger. This plunger is composed of two heads M and I—the one I carried by the tube H, the other M by the rod K. The heads are of substantially truncated conical form, as shown, their reduced ends facing each other. Over each cone or head M I is placed a cup J, of leather or the like, the two cups having their open mouths turned away from one another. The stem or rod K is threaded at the other end and is adapted to receive a nut O.

The above construction of the plunger has for its object the regulation of the pressure of the two cups J against the walls of the tube A. To accomplish this the nut O is screwed down on the stem or rod K against the tube H, so as to draw the cone M toward the cone I. The pressure thus produced upon the two

intervening cups J spreads them against the barrel A of the syringe. By this means any shrinkage in the leather of the cups is remedied, and the pressure of the plunger against the walls of the syringe can be regulated at will. In case it is necessary that the plunger should be lubricated, a drop of oil may be introduced between the cups J J on the cones. I can accomplish this without unscrewing the cap D by simply dropping oil into the tube H around the rod K, after loosening the nut O a short distance, and then allowing the oil to flow in the tube between the cups J. A groove to facilitate the flow of oil may be formed in the tube H or rod K. In this case it is not necessary to remove the plunger from the barrel of the syringe.

In Figs. 3, 4, and 5 I show another way for lubricating the cups J. In this case I place between these two cups J a small spool P, the stem or rod K of the piston passing through its center, as shown in Fig. 4. Before the plunger is placed in the barrel of the syringe a few drops of oil are placed in the hollow of this spool P, and will suffice to keep the syringe properly lubricated for a long while.

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

1. The combination of the shell of a syringe with the stem K, carrying a cone M, with the tube H, carrying the cone I, with the cups J, placed between these cones and adapted to be clamped between them, and with the nut O, which bears against the tube and fits the stem K, substantially as and for the purpose set forth.

2. The combination of the shell of a syringe with the cones M and I, furnished with cups or washers J, with the tube H, stem K, and nut O, whereby said cups or washers are distended, and with the spool-like collar P, placed between said cones M and I, and adapted to retain and feed oil to the cups or washers J, substantially as described.

GUSTAV OTTO.

Witnesses:

HARRY M. TURK,  
HARRY E. EVERDING.