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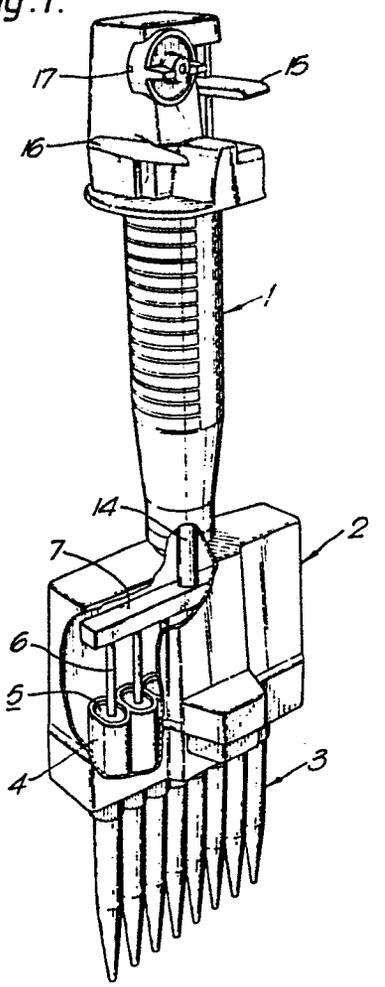
(54) **Line pipette.**

(57) A line pipette in which the diameter of its suction cylinder is longer in the direction transversal to the line than longitudinal to the line. In this way it has been possible to make their cross section area larger, yet without increasing their spacing.

Fig.1.



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LINE PIPETTE

The present invention concerns a multi-channel pipette with at least two liquid cylinders placed in a line. The pipette is used when dispensing liquid simultaneously into a plurality of containers, for instance onto a microtitration slide.

In photometric analyses, in particular, standardized microtitration slides containing 8 x 12 depressions are commonly used. It is frequently required that in numerous depressions of the slide is deposited, or therefrom removed, the same amount of liquid. With a view to making this work speedier, multi-channel pipettes have been devised by which, for instance, simultaneous dispensing into eight depressions is feasible.

Certain line serial pipettes are known in prior art, e.g. through the Patents FI 52025 (equivalent to US 4,215,092), FI 60137 (equivalent to GB 2,045,641), FI 57704 (equivalent to DE 30 08 347) and FI 58875 (equivalent to US 4,335,621), and through the publicly available patent application FI 844906 (equivalent to WO 84/04056). Through these references are also known so-called multi-step pipettes which enable, with one filling, several liquid quantities of equal amount to be dispensed.

Multi-step pipettes, in particular, have heretofore been hampered by the drawback that when endeavours are made to increase the liquid quantity that can be taken up in the cylinder at a time, the travel of the plungers becomes objectionably long.

The object of the present invention is therefore to provide a line serial pipette in which the stroke length of the plungers can be shortened.

It is essential in the pipette of the invention that the diameter

of the cylinders is greater in the direction transversal to the line than in the longitudinal direction. The cross section area of the cylinders could in this way be made larger, yet without increasing their spacing.

The invention is furthermore illustrated with the aid of the drawings attached. Fig. 1 presents a perspective view, partly opened, of a pipette according to the invention, Figs 2a, b, c and d present cross section shapes of the cylinders, Fig. 3 presents a partial section parallelling the line, and Fig. 4 presents an alternative to the embodiment of Fig. 3.

The main parts of the pipette depicted in Fig. 1 are a handle 1, a body 2 and tip reservoirs 3.

The body holds eight cylinders 4 disposed in a line, on the lower end of which the tip reservoirs are attached. The whole set of cylinders has been manufactured as one part and affixed to the body. In each cylinder is provided a plunger 5. The plunger rods 6 are suspended from a common support 7.

The most essential feature of the cylinders 5 is that their diameter is longer in the direction transversal to the line than in the longitudinal direction. It has been possible in this way to increase the cross section area of the cylinders without increasing their spacing.

Figs 2a, b, d and d present a few shapes of the cylinder cross section that can be contemplated.

For sealing the plungers 5 against the cylinders 4, there is an O-ring packing 9 in a groove in the outer surface of each plunger (Fig. 3). Hereby, the partition 10 between cylinders could be made thinner than in the conventionally applied design, in which the O-ring lies in a groove in the inner surface of the suction cylinder. In this way, the diameter of the cylinders could also be increased in the longitudinal direction of the line.

The conventional plunger sealing design may equally be applied in the pipette of the invention. In the design depicted in Fig. 4, the plungers have been sealed against the suction cylinders in that an O-ring is placed in a groove in the cylinder wall. Here too, however, the diameter of the plungers is larger across the line than longitudinal to the line.

The invention is applicable in constant or regulated capacity, one- or multiple step line serial pipettes. Designs of prior art for moving the plungers and for controlling their stroke length are applicable, as they are, in pipettes according to the invention.

The embodiment of Fig. 1 is a regulated capacity multiple step pipette, the operating mechanism in its handle being known in itself e.g. through the above-mentioned patent application FI 844906. The handle part 1 is detachable from the body. It houses a tooth rack with toothing on two sides, to which the stem 14 of the support is attached. The plungers are moved upwards by depressing the filling latch 15. The filling latch is attached to another tooth rack, of which the movement is transmitted to one toothing on the support's stem, by a pinion. The plungers are moved downwards with the aid of the dispensing latch 16. The dispensing latch pushes a striker resting against the other toothing on the stem, downwards along the stem. The distance over which the striker is in engagement is regulated with the aid of the adjustment wheel 17. With a guide groove on the adjustment wheel is associated a lifter which lifts the striker off the toothing at the desired point.

Claims

1. A line pipette comprising at least two suction cylinders (2) of similar cross section and with open lower end, disposed in a straight line, each of them containing a movable, sealed plunger (5), and a mechanism for moving the plungers through the same distance simultaneously, characterized in that the diameter of the suction cylinder in the direction transversal to the line is longer than that longitudinal to the line.

2. Pipette according to claim 1, characterized in that in the outer surface of each plunger has been embedded an O-ring packing (8).

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Fig.1.

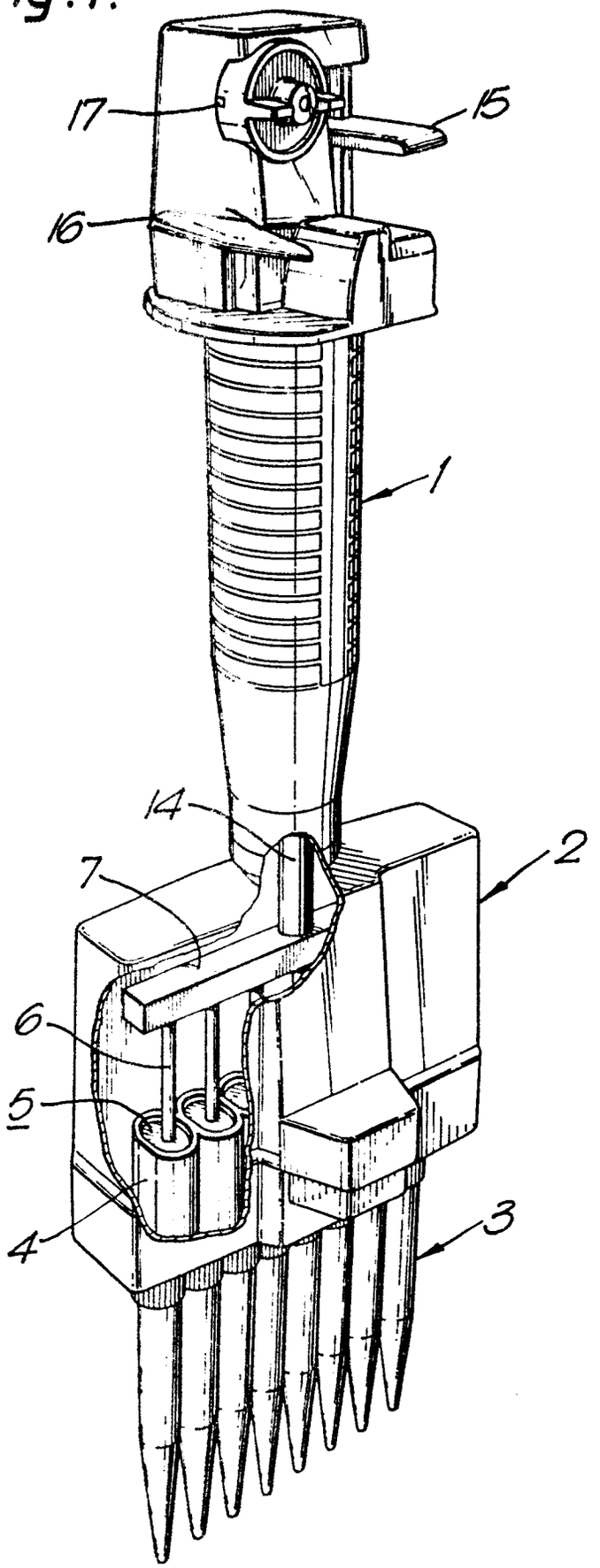

Fig.2a.

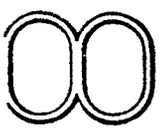

Fig.2b.

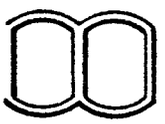

Fig.2c.

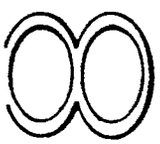

Fig.2d.

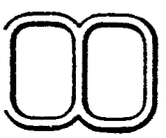

Fig.3.

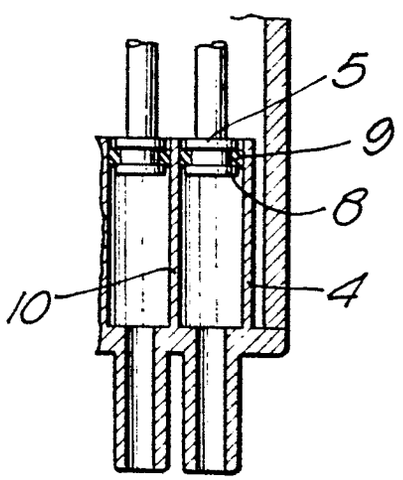

Fig.4.