

## A DEVICE FOR ALTERING THE DISTANCE BETWEEN SLIDE AND COVER-SLIP AT WILL

Shinya Inoué

(Translated from the Japanese article by the author in January, 2006)

While viewing small live specimen such as sea urchin eggs or protists, one encounters situations where one wishes to exchange the medium surrounding the specimen or to hold or compress the specimen between the slide and cover-slip. For such purposes, one could, e.g., support the cover-slip by placing small fragments of cover-slips or pieces of filter paper together with the specimen under the cover-slip, then perfuse fresh media from one end of the cover-slip while removing some medium with a piece of filter paper from the other end. However, with such an approach, the precious specimen could be washed away or squashed inadvertently. Here, I wish to describe a device that I have designed in order to freely enable

compressing, without squashing, various small living cells.

Figure 1 is a perspective view, and Fig. 2 shows its cross section. As shown in the figures, the cover-slip, supported above the slide by a thin glass rod (6), is gently pressed downward on side A with a thin spring (3) and on side B by plate (2). But owing to its elasticity, plate (2) is constantly attempting to open upwards, thereby pushing up against axel (4) via glass tubing (5). Since the glass tubing is cemented onto the axel eccentrically, turning the axel (4) either pushes down or releases the spring plate (2). Accordingly, side B of the cover-slip moves down or up, while the space between the slide and cover-slip opens or closes on side A.

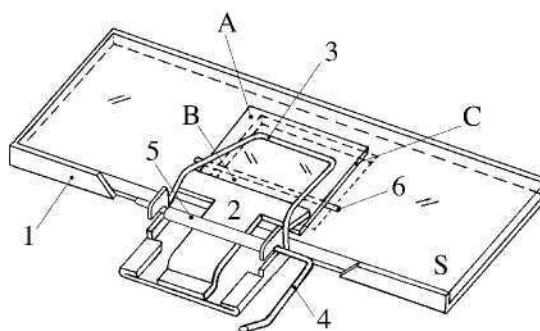


Fig. 1.

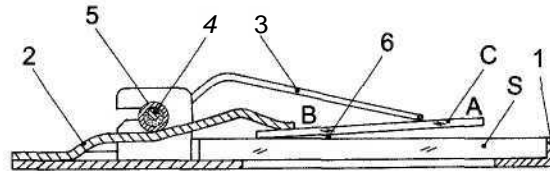


Fig. 2.

By reducing the difference in inside diameter of the glass tubing (5) and outer diameter of axel (4), B is pressed down or rises by a very small amount associated with a large rotation of axel (4). Thus, one can compress or release objects near side A. By such means, one can freely exchange the bathing medium by slightly compressing and holding onto the cell, or capture *Paramecia* and *Colpedia* during observation. Furthermore, since it is possible to use this device to compress, e.g., *Paramecia* at any desired speed to any desired degree, the device should be convenient, for example, for studying the extrusion of protoplasm from cells.

In practice, one can vary the range of application of this device by changing the diameter and location of the glass rod (6). Thereby, one can freely capture or compress various cells as large as 100  $\mu\text{m}$  or as small as a few  $\mu\text{m}$ . However, since the cover-slip bends slightly by

the mechanical forces applied, and since the slide and cover-slips are not exactly parallel to each other, the space between them varies somewhat depending on location.

Upon actual use, one may encounter considerable current flow associated with expulsion of the medium following the downward movement of the cover-slip. However, this is not a major problem since on the one hand, it is possible to avoid regions with such violent flow, and on the other hand, it is even possible to take advantage of some flow in order to displace (rotate) the specimen under observation.

Finally, with reference to the actual material that I used, support (1) was made from a thick sheet of (non-annealed) dental "Platinoid" material, the sheet spring (2) from a thin sheet of dental silver alloy, axel (4) from a stainless sewing needle, and spring (3) from a piece of violin E string.