

hand to prevent displacement in the flexion plane practically completely, but on the other hand a sufficient flexibility to deal with the reed's flexion without fear for fatigue.

According to a further elaboration of the invention, it is provided that at the second location the flexion member or reed is clamped between clamping surfaces which are somewhat convex towards the reed. Because with the invention some pivot movement of the reed is possible at the location of the clamping, this way of engagement of the reed and clamping members is precise as well as flexible.

With application of the invention in a step configuration of the reeds, as per se known from U.S. Pat. Nos. 4,283,178 and 4,473,356 and wherewith the reeds have the same length, it is preferably provided that the first, second and third support locations are arranged in corresponding step configurations.

A preferred embodiment of the invention, with which the reeds may be located in step configurations above each other or not, is where the first support means for the flexion members contains a connection between one of the conductors of the flexion members and a conducting plane which is mainly parallel to the plane in which the flexion members flex.

Such a connection may be a solder connection between, for instance, the central leaf and the conducting plane, but weld connections and fixation by clamping or screwing is also possible.

With this embodiment, it is possible to eliminate the consequences of any differences in the initial flexion for curvature of the reeds.

The other conducting part can be connected to a related electrical terminal by means of, for instance, a conducting wire, soldering, welding and/or screwing.

Furthermore, this embodiment is very suitable for duplicating. By use of two sets of reeds, each set is mounted in step configuration with its reeds located above each other and the conducting surfaces with which the solder or weld connections are made being located on opposing surfaces of a plate located in the space between elongations of the reeds and parallel to the flexion plane of the reeds.

According to a further elaboration of the invention, an extremely advantageous manufacturing method of such a device is obtained by providing that the flexion members at their second locations are mounted somewhat tiltable in their flexion plane. Then, the flexion members in their third locations are positioned such that they are adjusted with respect to the tactile members and the flexion members in the first locations are then attached in this adjusted condition. Thus, it is possible to make allowance for the initial curvature of the reeds in such a way that standard tactile members will suffice practically without any adjustment.

It has appeared that compensation of the individual shape of the reeds is possibly by attaching the ends of the reeds in the first location in a position in which the reed's ends cooperating with the tactile members are rightly located.

A further advantage of a display device manufactured in this way consists in that the tactile members are small pins having a fixed length in dependence on their location in the step configuration. This fact allows for demounting and mounting without necessity that the same pin is mounted at its earlier location. Consequently, cleaning and service are eased and time and labour saved.

In this respect it is remarked that such devices in the long run pick up a certain quantity of dirt, for instance cutaneous fat. It is then common to demount such a device, for instance a braille reading ruler, and to clean the tactile members carried out as pins with rounded heads, as well as the plate with holes through which the pins may protrude.

With the discussed embodiment of the invention, a pin of predetermined length is always suitable for each and any display point located at the same place in the step configuration.

The invention preferably is executed as an extended braille cell with two rows of four tactile points. Consequently, it is possible to give, apart from the usual braille notation, additional information such as capitals, cyphers, musical notations and so on. Such information can also be displayed in six-points braille display cells by vibrating one or more tactile members, as is known from for instance U.S. Pat. No. 4,445,871. The invention allows the same procedure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 schematically shows a side view of a braille cell in which the invention has been applied;

FIG. 2 is a cross section through the cell depicted in FIG. 1 along the line II—II;

FIG. 3 shows a view, partly in cross section and on a larger scale along the line III—III of FIG. 1;

FIG. 4 shows a partial view on an enlarged scale of FIG. 2;

FIG. 5 shows a side view of a reed; and

FIG. 6 shows on a larger scale the clamping of the reed.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawings reference 1 indicates a frame with a lower beam 2, a central baffle 3 with both sides attached to it, protruding horizontal support baffles 4, 5 and 6, and an upper beam 7.

At both sides of baffle 3 in horizontally open interspaces are respective piezoelectric reeds 8, 9, 10 and 11. Reeds 8, 9, 10, and 11 are respectively mounted between the lower beam 2 and the first support baffle 4; between the first support baffle 4 and the second support baffle 5; between the second support baffle 5 and the third support baffle 6; and between the third support baffle 6 and the upper beam 7. Cooperating with these reeds are pins 12, 13, 14, and 15, which can freely move up and down in bores 16, 17, 18 and 19 made in the upper beam 7. On upper beam 7, a palpating plate 20 has been mounted in a removable way having holes in the elongation of the holes 16, 17, 18 and 19. These pins 12, 13, 14 and 15 have a length adapted to the height of the reeds 8, 9, 10 or 11 with which they cooperate. Thus, if the associated reed flexes in a way known per se under influence of an electric voltage, a rounded head of the related pin protrudes at the upper side of the plate 20 and is thereby palpable. In this shown embodiment, there are two rows of four pins. This means that a braille display of a character or sign is possible with additional information such as an indication for by cyphers, capitals, musical notation and the like.

As more specifically shown in FIG. 5, the reeds 8, 9, 10 and 11 are formed by a thin central conducting leaf 21 of, for instance, brass. At both sides of leaf 21, a piezoelectric layer 22 and 23 respectively has been applied. On layers 22 and 23 there is a conducting layer 24