

CONTAMINANT-TOLERANT BRAILLE PINS

CROSS-REFERENCE TO RELATED APPLICATIONS

This disclosure is a divisional application claiming the benefit of the filing date of U.S. patent application entitled: "Contaminant-Tolerant Braille Pins," filed by the same inventor on Aug. 4, 2004, bearing Ser. No. 10/710,808 now U.S. Pat. No. 6,902,403.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates, generally, to Braille pins. More particularly, it relates to a Braille pin and a pinhole or bore construction that inhibits fouling of the Braille pin by debris or contaminants.

2. Description of the Prior Art

Braille cells typically include a plurality of solid housings of parallelepiped construction. Each housing has six (6) or eight (8) pinholes or bores formed therein. Accordingly, six (6) or eight (8) Braille pins are housed in each Braille cell. The pins are arranged in two (2) columns of three (3) or four (4) pins each.

When in repose, each pin is in a retracted position where it is fully positioned within the bore formed in the housing. When not in repose, the uppermost tip of each pin, known as a Braille dot, extends from the bore where it can be felt by a user.

A Braille cell assembly is a collection of Braille cells. The pins are captive within a housing and its bore. Theoretically, the housing could be made from one housing part that serves as a base part for assembling the benders (bimorphs), circuit and pins, but this is not practical. Typically, there is at least a second part called the cap. The cap is removable and can have different heights. When combined with matching different length pins, the Braille cell assembly can be fitted to various products that have different heights. The base part of the Braille cell can be mass produced and later fitted with the appropriate height cap and pin to suit the application. The removable caps and pins facilitate serviceability of the cell as well.

The Braille pins are selectively extended by actuator means to represent Braille characters. The pins often become stuck when fouled by contaminants. When fouled, they cannot be displaced up or down reliably and the value of the Braille reader of which the pins form a part is reduced.

Thus there is a need for an improved Braille pin construction that is not fouled by ordinary amounts of debris and other contaminants.

The manufacturing of Braille readers is problematic because Braille pins are small and the bores within which they fit are also small. A single Braille cell typically includes eight (8) bores for receiving pins. Thus, even a small Braille reader having twenty (20) cells will require the manual insertion of one hundred sixty (160) Braille pins into one hundred sixty (160) bores.

A need therefore exists for an improvement in Braille pins that would facilitate the assembly of Braille readers.

However, in view of the prior art considered as a whole at the time the present invention was made, it was not obvious to those of ordinary skill in this field how the identified drawbacks of the prior art could be overcome in an effective, efficient, and economical manner.

SUMMARY OF INVENTION

The longstanding but heretofore unfulfilled need for an improved Braille pin is now met by a new, useful, and non-obvious invention.

The novel Braille pin is designed to allow contaminants to fall past areas of the pin that could create a restriction to the pin's travel. This improvement is significant because it helps prevent the sticking of Braille dots in the product and extends the time required between cleanings.

Each pin of the plurality of Braille pins has a three (3) part construction. Moreover, the bore that receives the novel Braille pin has three sections. Accordingly, each part of the pin is received within a different section of the bore. Specifically, the first part of the pin is received within the first section of the bore, the second part of the pin is received within the second section of the bore, and the third part of the pin is received within the third section of the bore.

In a preferred embodiment, each pin has a first part of solid or hollow construction having a predetermined longitudinal extent and having a circular transverse cross-section although many different cross-sections can be used to attain the advantages of this invention. The first part of the pin includes a rounded distal free end, known as a Braille dot, adapted for tactile communication with a user of the Braille reader, also known as a Braille display case, of which the novel Braille pins form a part.

A second part also has a solid or hollow construction having a predetermined longitudinal extent but its breadth is greater than that of the first part. Accordingly, a first shoulder is formed where the first and second parts meet. The transverse cross-section of the second part is independent of the transverse cross-section of the first part and may be of any predetermined geometrical configuration, including circular and non-circular.

The second part of the Braille pin provides the bearing surface of the pin, i.e., it slidably engages the sidewall of the second section of the bore. The first and third parts of the pin are received within the first and third sections of the bore, as aforesaid, but said parts do not slidably engage or otherwise abut their respective bore sections.

In a proposed commercial embodiment where the transverse cross-section of the second section of the pin-receiving pinhole or bore is circular, the transverse cross-section of the pin second part has four radially-extending fins or projection, the radially outermost edges of which form a minimal area of contact with the sidewall of said second section.

The transverse cross-section of the second pin part is independent of the transverse cross-section of the first or third pin parts and may be of any predetermined geometrical configuration, including circular and non-circular.

The first shoulder provides a stop means that limits upward travel of the Braille pin when it is in operation.

A third part of the pin abuts the second part and has a solid or hollow construction having a predetermined longitudinal extent. The breadth of the third part is less than the breadth of the second part. A second shoulder is therefore formed where the second and third parts meet. The second shoulder provides a stop means that limits the downward travel of the Braille pin when it is operatively disposed in a Braille cell.

The third part has a transverse cross-section of any predetermined geometrical configuration, including circular and non-circular. The transverse cross-section of the third part is independent of the transverse cross-section of the first and second parts.

In all embodiments where the pinhole or bore has a second section having a transverse cross-section of circular