PATENTS EXAMINATION BOARD

Subject: The Drafting of Patent Specifications - Paper 1

Date: January 2021

Time: 09h00 -13h00 (although candidates requiring extra time are entitled to an additional two hours)

Examiners: L Cilliers
V Williams

Moderator: J D Whittaker

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1. QUESTION 1

Your client, who has filed many patents with you, sends you the following description and drawings for his new electronic connector:

"*Universal Serial Bus (USB) connectors allow for the transmission of power and data between two or more devices. These connectors include a female connector ("**USB receptacle**") which is designed to mate with a male connector ("**USB plug**"). For example, a USB plug on a cable extending from a first device, such as a mobile phone, may be mated with a USB receptacle on a second device, such as a laptop, for transmitting data between the two devices.*

USB connectors, like many other standard data connectors, require that the USB plug be mated with a corresponding USB receptacle in one, specific orientation. Such connectors are also known as polarized connectors.

It is sometimes difficult for a user to determine the correct orientation of a USB receptacle before inserting a USB plug into the receptacle. Some USB plugs and receptacles include markings to indicate their orientation so as to facilitate the proper insertion of the USB plug into the USB receptacle. However, these markings are often not utilised because, apart from being confusing for some users (manufacturers do not all apply these markings in a consistent manner), the markings are not always easily visible, for example when access to a USB receptacle is limited or when ambient

lighting conditions are poor. A user who incorrectly inserts a USB plug into a USB receptacle, apart from generating user frustration, may damage the USB interface as well as the USB receptacle on the device.

It is therefore desirable to provide a USB plug which can mate with a standard USB receptacle in a reversible or dual orientation.

A USB plug according to the present invention is designed for connection to a standard USB receptacle in either a first orientation, or a second orientation in which the USB plug has been rotated through 180 degrees relative to the first orientation.

The USB plug of the invention is illustrated in the attached drawings in which: FIG. 1A shows a partial cross-sectional perspective view of the plug; and FIG. 1B shows a cross-sectional view of the plug.

The USB plug 10 includes a body 15 and a shell 20 extending from the body. The shell 20 includes an opening 25 leading into a cavity defined by four inner surfaces of the shell 20, i.e. an upper inner surface 20a, a lower inner surface 20b, and two side inner surfaces 20c and 20d. The cavity terminates internally at upper and lower end walls 35a and 35b of a support member 35, and a tongue 30 extends into the cavity from the support member 35. As shown in FIG. 1A and FIG. 1B, the tongue 30 may be centrally located between the upper inner surface 20a and the lower inner surface 20b. USB contacts 40a to 40d are disposed on an upper surface 30a of the tongue 30, and four additional USB contacts (only one of which, contact 40e, is visible in FIG. 1B) are disposed on a lower surface 30b of the tongue. The tongue 30 may include a bullnose tip 30c for reasons that will be explained below.

The USB plug 10 may have a 180 degree symmetrical, double orientation design so that it may be inserted into a corresponding USB receptacle in either a first orientation, for example an orientation in which the tongue upper surface 30a is facing up (as shown in FIG. 1B), or in a second, inverted orientation in which the tongue upper surface 30a is facing down. To allow for the dual orientation, the tongue 30, in the orientation shown in FIG. 1B, is divided into top and bottom halves along a central, horizontal plane, with the shape of the upper half of the tongue 30 corresponding symmetrically with the shape of the lower half of the tongue. Similarly, the tongue 30 is divided into left and right halves along a central vertical plane, with the shape of the left half of the tongue 30 corresponding symmetrically with the shape of the right half of the tongue. Importantly, the USB contacts 40a to 40d on the upper surface 30a of

the tongue 30 are arranged to mate with corresponding contacts of a USB receptacle when the USB plug 10 is inserted into the USB receptacle in the first orientation. Similarly, the additional USB contacts on the lower surface 30b of the tongue 30 are arranged to mate with corresponding contacts of the USB receptacle when the USB plug 10 is inserted into the USB receptacle in the second orientation.

When the USB plug 10 is inserted into a USB receptacle, the bullnose 30c of the tongue 30 serves to deflect the tongue towards the appropriate region within the USB receptacle regardless of whether the USB plug is in the first orientation or the second orientation, as described above. Portions of the tongue 30 may deform and deflect in different manners to ensure that the relevant contacts on the tongue 30 correctly mate with corresponding contacts of the USB receptacle. The thickness of tongue 30 may be varied depending on the material of the tongue so that it may elastically deform as necessary for mating events.

The body 15 is the portion of the USB plug 10 held by a user when inserting or removing the USB plug. The body 15 may be made from a variety of different materials such as, for example, a thermoplastic polymer. The contacts 40 may be formed from any appropriate conductive material and may be printed on the surfaces 30a and 30b using techniques similar to those used for printing contacts on printed circuit boards. As with standard USB plugs, the plug 10 may include contacts for power, ground and differential data signals. For example, the contact 40a may be a ground pin, the contact 40b may be a Data+pin, the contact 40c may be a Data−pin, and the contact 40d may be a power pin."

The candidate is required to identify the inventive feature(s) of the invention, and to draft up to three claims to protect the above invention.

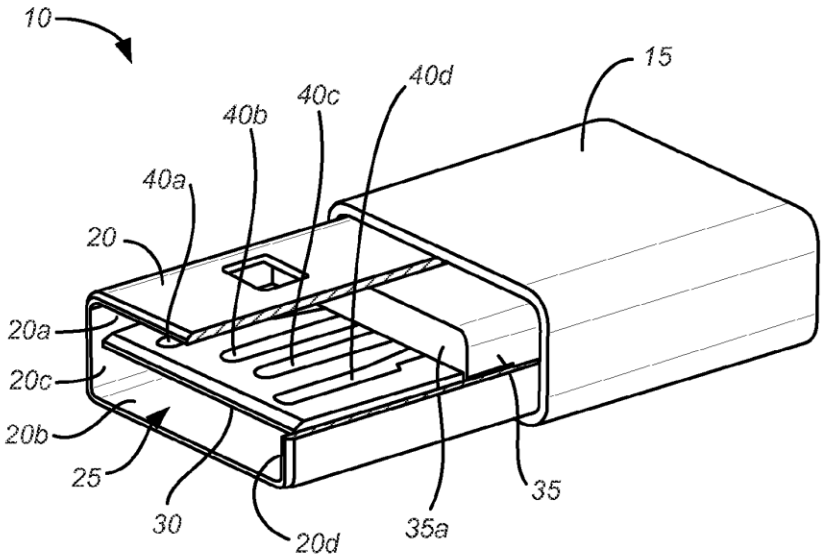

10
15
40d
40c
40b
40a
20
20a
20c
20b
25
30
20d
35a
35

FIG. 1A

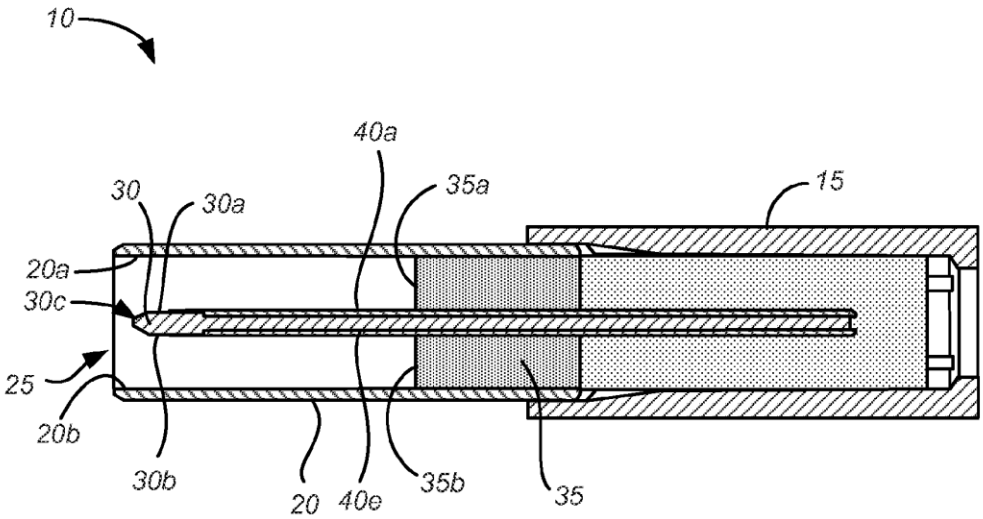

10
40a
30
30a
35a
15
20a
30c
25
20b
30b
20
40e
35b
35

FIG. 1B

2. QUESTION 2

A new client hands you the attached drawings (FIGS. 1 to 5) of his new connector for connecting square pipes together, in which:

FIG. 1 shows a longitudinal section of a pipe connector partially connected to a pipe;

FIG. 2 is a section along line 2-2 of FIG. 1;

FIG. 3 shows a longitudinal section of the pipe connector fully connected to the pipe;

FIG. 4 is a section along line 4-4 of FIG. 3; and

FIG. 5 is an exploded perspective view of the composing members.

Your client also hands you the attached drawing of a prior art square section pipe connector. He tells you that the prior art connector has a cube-like body from which two connecting spigots extend at right angles relative to one another. Each of the spigots has a substantially square cross section, and is sized to enter an end of a square section pipe so that the two pipes are held together in a right-angled configuration.

A problem with the prior art connector, according to your client, is that the cross-sectional dimensions of each spigot have to be accurate in order to properly lock the pipes to the spigots with a friction fit. This complicates the production of the connector and makes it relatively expensive to produce.

Your client then hands you the following description of his new connector:

"*My new connector includes a generally cube-shaped body 2, two elongate connecting members 1 extending from the body 2, and a head 4 projecting from the end of each connecting member 1. The connecting members 1 each have a generally square cross section, as best seen in FIGS. 2 and 4 of the drawings, and each member 1 tapers from a first end 1' (adjacent the body 2) to a second end 8 (adjacent the head 4).*

My connector also includes a locking sleeve 3 for locking each connecting member 1 to a square section pipe P. Each locking sleeve 3 has an outer surface with a square profile so as to conform with the inner surface of the square section pipe P, and an inner surface which generally conforms with the outer, tapered surface of each

connecting member 1. Each locking sleeve 3 includes four longitudinal slots 6 which extend from a first end of the sleeve, and four longitudinal slots 7 which extend from a second, opposite end of the sleeve, as shown most clearly in FIG. 5 of the drawings. The locking sleeve 3 is formed from an elastic material, and the slots 6 and 7 facilitate deformation of the elastic sleeve in a manner which is described in more detail below.

To connect a pipe P to one of the connecting members 1, a locking sleeve 3 is first inserted into an end of the pipe P. The pipe, with the locking sleeve 3 therein, is then positioned adjacent the head 4, with its longitudinal axis aligned with the longitudinal axis of the connecting member 1, and with its square profile offset by 45 degrees relative to the square cross section of the connecting member 1. In this orientation, the pipe P and the locking sleeve 3 are slid longitudinally over the connecting member 1 into the position illustrated in FIGS. 1 and 2 of the drawings. FIG. 2 shows clearly how the square profile of the pipe P is offset (or rotated) by 45 degrees relative to the square cross section of the connecting member 1. This relative orientation of the pipe P and the connecting member 1 is important for the locking sleeve 3 to pass over the head 4. In this orientation, the relatively long radial extent of the slots 7 in the second end of the locking sleeve 3 allows this end of the locking sleeve to deform sufficiently to permit its passing over the head 4 when the pipe P and the sleeve 3 are slid into the position illustrated in FIGS. 1 and 2.

To lock the pipe P to the connecting member 1, the pipe P is rotated about its longitudinal axis, relative to the connecting member 1, through 45 degrees from the unlocked position illustrated in FIGS. 1 and 2 into the locked position illustrated in FIGS. 3 and 4. As the pipe P is rotated into the locked position, the inner surface of the locking sleeve 3 rotates over the outer surface of the connecting member 1 until the square profile of the pipe P is aligned with the square cross section of the connecting member 1 (see FIG. 4). As the locking sleeve 3 is displaced into the locked position, it is deformed between the inner surfaces of the pipe P and the outer surfaces of the connecting member 1. In this regard, the slots 6 allow the sleeve 3 to expand along the tapered length of the connecting member 1 and to firmly grip the inner surface of the pipe P. In the locked position, the relatively short radial extent of the slots 7 in the second end of the locking sleeve 3 prevents the required deformation for this end of the locking sleeve to pass back over the head 4, and thereby secures the pipe P to the connecting member 1.

My connector is not limited to the connection of square pipes, and may also be used to connect other non-circular pipes such as, for example, pipes with an oval cross section.

My new connector is preferable to the prior art connector because the deformable locking sleeve 3 allows for relatively large tolerances with the result that the connecting member 1 need not be produced to precise dimensions."

FIG.1

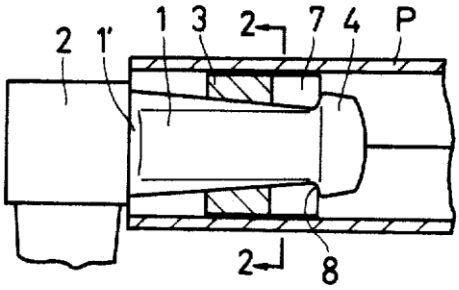


FIG.2

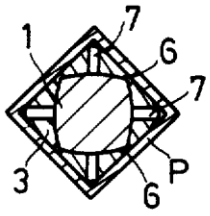


FIG.3

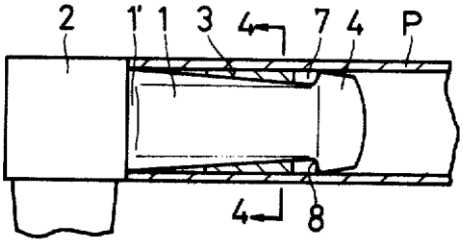


FIG.4

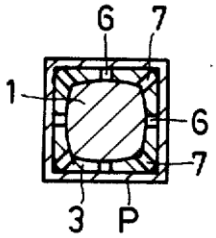
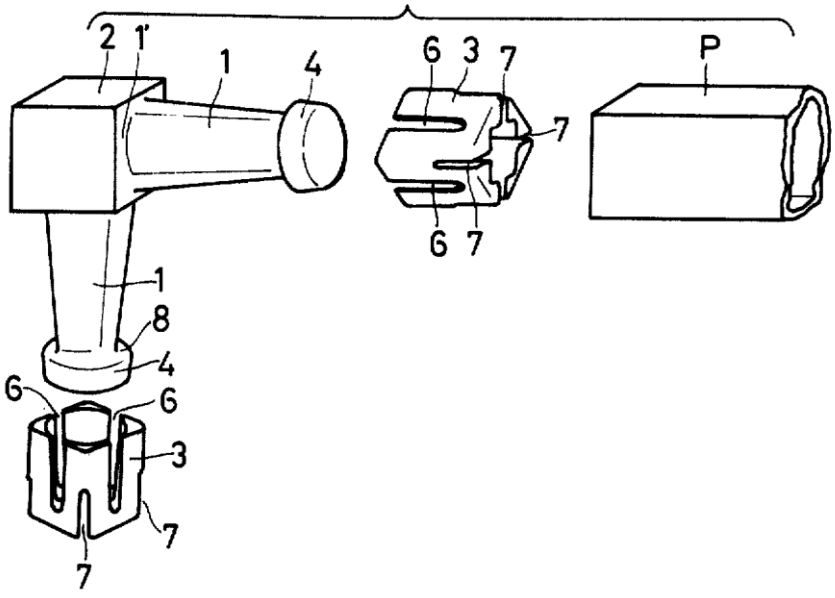


FIG.5



PRIOR ART SQUARE SECTION PIPE CONNECTOR

The candidate is required to identify the inventive feature(s) of the invention, and to draft up to three claims to protect the above invention.