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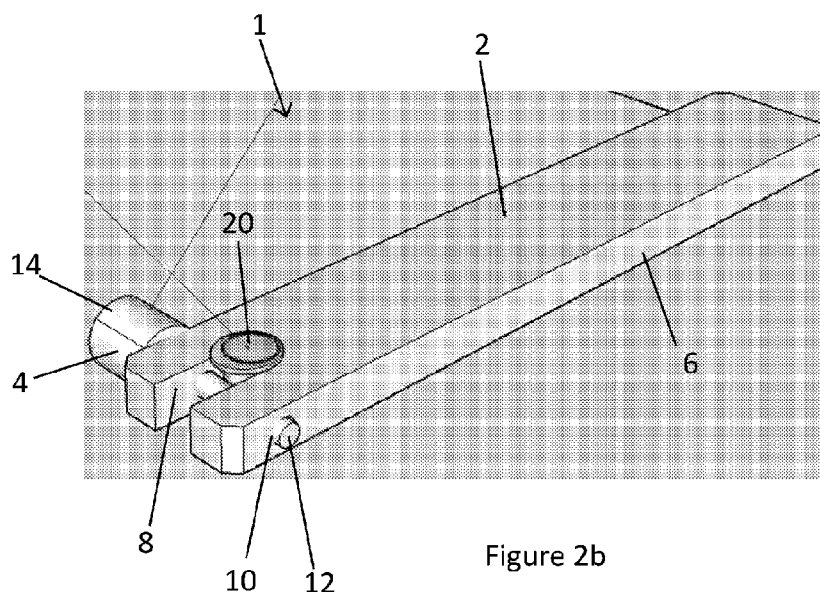


Figure 2b

(57) Abstract: Centrifuge Tube Handling Device A device (1) for handling centrifuge tubes (20) includes an elongate member (2) that has two ends. The elongate member (2) has a handle portion (6) for holding the device (1) at one end of the elongate member (2) and a slot (8) formed in the opposite end of the elongate member (2) to the handle portion (6). The slot (8) is shaped to receive a centrifuge tube (20). [Figure 2b]



- 1 -

Centrifuge Tube Handling Device

5 This invention relates to a device for handling centrifuge tubes, in particular to a device for picking up, holding and putting down centrifuge tubes.

Centrifuge tubes are used to contain samples which are then placed in centrifuge machines for separation into the different density components of a sample. There are many uses for such centrifuge tubes, including the separation of chemical and
10 biological samples. In some of these uses a sample may contain toxic and/or radioactive material.

Conventionally, scientists and technicians handle centrifuge tubes with their hands which puts these users at risk of coming into contact with, and therefore being
15 exposed to, toxic and/or radioactive material when a sample contains such material. This may lead to the contamination of anything else that the user touches.

The present invention seeks to provide an improved method of handling centrifuge tubes.

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When viewed from a first aspect the invention provides a device for handling centrifuge tubes, wherein the device comprises:

an elongate member having two ends;
wherein the elongate member comprises a handle portion for holding
25 the device at one end of the elongate member; and
a slot formed in the opposite end of the elongate member to the handle portion, wherein the slot is shaped to receive a centrifuge tube.

The present invention provides a device for handling centrifuge tubes. The device
30 includes an elongate member with two ends, i.e. a first end and a second end wherein the first end is at the opposite end of the elongate member from the second end. The elongate member has a handle portion by which the device can be held, e.g. in a user's hand. The handle portion is provided at one end (e.g. the first end) of the elongate member.

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- 2 -

At the opposite end of the elongate member (e.g. the second end), the elongate member has a slot formed in this end (i.e. the opposite end of the elongate member from the handle portion). The slot is shaped to receive a centrifuge tube.

5 The handling device for a centrifuge tube thus allows a centrifuge tube to be handled using the device at a safe distance, by holding the handle portion and sliding the device onto a centrifuge tube such that the centrifuge tube is received into the slot of the device. Thus it will be appreciated that the device of the present invention allows a centrifuge tube to be picked up (e.g. from a rack), held, moved
10 and placed down without the user touching the centrifuge tube directly with their hands.

Being able to manipulate a centrifuge tube using the device thus removes any direct contact between the user (e.g. their hands) and the centrifuge tube. Thus, the
15 device allows a user to avoid contact with the material in a centrifuge tube such that the safety of a user is greatly improved when the centrifuge tube contains toxic or radioactive materials because the device spaces the user's hand from the centrifuge tube, owing to the elongate member of the device which separates the user's hand from the centrifuge tube in the slot at the other end of the elongate
20 member. It will be appreciated that by avoiding direct contact between the user and a centrifuge tube, the device helps to prevent contamination of the environment from the material in the centrifuge tube because the device significantly reduces the likelihood for the user to get the material in the centrifuge tube on their person.

25 The centrifuge tube may be any suitable and desired type and/or size of centrifuge tube. The slot for a given device is therefore shaped to receive the type and/or size of centrifuge tube for which it is to handle. Preferably the slot is shaped to receive a micro-centrifuge tube or an Eppendorf (RTM) tube.

30 The centrifuge tube may have any suitable and desired volume. Preferably the centrifuge tube has a volume of between 0.25 ml and 50 ml, e.g. between 0.5 ml and 10 ml, e.g. between 1 ml and 5 ml, e.g. approximately 1.5 ml.

The elongate member may have any suitable and desired shape. In one
35 embodiment the handle portion of the elongate member is ergonomically shaped,

- 3 -

e.g. the handle may comprise a (e.g. ergonomic) hand grip. However in a preferred embodiment the elongate member is substantially cuboid, e.g. apart from the slot formed in one end of the elongate member. A substantially cuboid elongate member with the slot formed therein simplifies the manufacture of the handling device as it can be easily cut out of a piece of material.

Thus preferably the length of the elongate member (e.g. the dimension in which the elongate member is longitudinally extended, such that the handle portion and the slot are at respective opposite ends of the length of the elongate member) and/or the width of the elongate member (e.g. the dimension in which the slot is formed) and/or the depth of the elongate member (e.g. the dimension through which the slot is formed) is substantially constant over the whole of the elongate member. It will be appreciated that preferably the length, width and depth of the elongate member are defined as orthogonal dimensions.

Preferably the length of the elongate member (e.g. apart from the slot) is substantially uniform along the width and the depth of the elongate member. Preferably the width of the elongate member is substantially uniform along the length and the depth of the elongate member. Preferably the depth of the elongate member is substantially uniform along the length and width of the elongate member.

The elongate member may have any suitable and desired dimensions. Preferably the elongate member has a length that is greater than a width and a depth of the elongate member. Preferably the width of the elongate member is greater than the depth of the elongate member.

Preferably the length of the elongate member is between 10 cm and 30 cm, e.g. between 15 cm and 25 cm, e.g. approximately 20 cm. This length of the elongate member keeps the user's hands at a sensible distance from the centrifuge tube (to avoid the user's hands coming into contact with the centrifuge tube and thus the material therein) while giving the user the necessary control of the handling device to be able to manipulate the centrifuge tube safely (e.g. while inserting the centrifuge tube into the slot, taking it out of a centrifuge rack and putting the centrifuge tube into a centrifuge machine).

- 4 -

Preferably the width of the elongate member is between 15 mm and 50 mm, e.g. between 25 mm and 40 mm, e.g. between 30 mm and 35 mm, approximately 32 mm. The width of the elongate member, particularly at the handle portion end of the elongate member, helps to allow the device, when the centrifuge tube is located in the slot of the elongate member, to be sat down to rest without tipping over (e.g. such that the centrifuge tube remains substantially vertically). As will be described in more detail below, preferably the retention of the centrifuge tube in the slot is sufficient to oppose the weight of the elongate member from pushing the centrifuge tube out of the slot, when the device is set down with the centrifuge tube in the slot.

Preferably the depth of the elongate member is between 7 mm and 15 mm, e.g. between 9 mm and 13 mm, e.g. approximately 11 mm. Preferably the (e.g. maximum) depth of the elongate member (particularly at the slot end of the elongate member) is determined by the height by which the centrifuge tube sits above the centrifuge rack (which may depend on the size (e.g. height) of the centrifuge tube to be manipulated and/or the size (e.g. height) of the centrifuge rack). Thus different versions of the device having different depths may be provided to suit different types of centrifuge tubes and/or centrifuge racks. The minimum depth of the elongate member may be determined by that needed to make the elongate member rigid while minimising the weight of the device.

The slot may be provided (e.g. formed in the elongate member) in any suitable and desired way. In one embodiment the slot extends from the end of the elongate member into the elongate member in the direction in which the elongate member is longitudinally extended, e.g. in the direction of the length of the elongate member and in the direction in which the centrifuge tube is inserted into the slot of the elongate member.

Preferably the slot is formed in the end of the elongate member such that this end of the elongate member comprises two prongs with the slot formed therebetween. Preferably the handle portion and the slot of the elongate member are integrally formed. Thus preferably the elongate member is made out of a single piece of material. This helps to simplify the manufacture of the device, e.g. once the elongate member has been formed, the device may be formed just by cutting the

- 5 -

slot out of the end of the elongate member opposite the handle portion end of the elongate member. Thus preferably the elongate member has no moving parts, e.g. the two prongs are fixed such that the slot is passive (e.g. compared to a pair of tongs which may be used to pick up items).

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Preferably the slot has a uniform depth and/or a uniform depth (e.g. a uniform cross section) along substantially the length of the slot (i.e. in the direction in which the slot extends into the elongate member). Preferably the slot has substantially straight sides (e.g. along the length of the slot and/or through the depth of the slot), e.g. the slot may have substantially flat sides that are, e.g. substantially parallel to each other. Preferably the slot comprises a rounded terminal end (at the end of the slot that is distal from the end of the elongate member in which the slot is formed). Preferably the rounded end has a radius of curvature approximately equal to the external radius of a centrifuge tube to be handled using the device. This helps to provide a good fit for the centrifuge tube in the slot.

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The slot may be provided in any suitable and desired way to retain a centrifuge tube, e.g. such that when the device is used to manipulate a centrifuge tube, the centrifuge tube is held securely in the slot. Thus the slot may comprise an active retention mechanism (e.g. a latch) to retain the centrifuge tube in the slot.

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However, preferably the slot is shaped and sized such that a centrifuge tube is held in the slot (e.g. solely) owing to friction between the (e.g. sides of the) slot and the centrifuge tube in the slot. Thus preferably the internal dimensions of the slot are approximately equal to the external dimensions of a centrifuge tube. Preferably the width of the slot (e.g. the dimension parallel to the width of the elongate member which is perpendicular to the direction in which the slot extends into the elongate member and which is perpendicular to the sides of the slot) is approximately equal to the external diameter of a centrifuge tube (e.g. the diameter of the main cylindrical body of the centrifuge tube) to be inserted into the slot.

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Preferably the slot has a width of between 5 mm and 15 mm, e.g. between 8 mm and 12 mm, e.g. approximately 10 mm (e.g. for a 1.5 ml centrifuge tube). This helps to provide a good friction fit for the centrifuge tube. The width of slot, when it matches the width of the centrifuge tube, also means that when a centrifuge tube is

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- 6 -

located in the slot (which typically comprises a lip around the top of the centrifuge tube), the lip helps to prevent the centrifuge tube from dropping through the slot, e.g. in addition to the friction fit.

- 5 Preferably the slot has a depth of between 7 mm and 15 mm, e.g. between 9 mm and 13 mm, e.g. approximately 11 mm. Thus preferably the slot has a depth approximately equal to (e.g. the same as) the depth of the elongate member. The depth of the slot helps to hold a centrifuge tube stably in the slot (e.g. by minimising the lateral movement of a centrifuge tube in the slot) and helps to improve the
- 10 friction fit of a centrifuge tube in the slot.

- The (e.g. elongate member of the) device may be made from any suitable and desired material, e.g. metal. In a preferred embodiment the (e.g. elongate member of the) device is formed from plastic, e.g. polytetrafluoroethylene (PTFE). This helps
- 15 to provide a device which is easy to manufacture and clean (e.g. easy to remove radioactivity therefrom).

- Preferably the (e.g. elongate member of the) device is formed (e.g. milled) out of a piece (e.g. sheet) of material (e.g. plastic). Preferably the piece of material from
- 20 which the device is formed has a thickness which defines the thickness of the elongate member, e.g. when the device is milled out of the piece of material. This simplifies the manufacturing process as the shape of the device may simply need to be cut out from the piece of material.

- 25 Preferably the elongate member is substantially rigid. This helps to provide good control of the device when it is being used to manipulate a centrifuge tube.

- In one embodiment the corners of the elongate member (e.g. at the end in which the slot is formed) are chamfered. Preferably the chamfer extends in a direction
- 30 along the depth of the elongate member. This may enable the device still to be milled out of a piece of material simply by cutting out the shape of the device. Thus preferably the device has a uniform cross section along its depth.

- In some embodiments, the device may simply rely on a friction fit between the slot
- 35 and a centrifuge tube located in the slot to retain the centrifuge tube in the slot.

- 7 -

However, in a preferred embodiment, the device comprises a retaining member arranged to prevent a centrifuge tube, located in the slot, from being removed from the end of the slot at the end of the elongate member (i.e. from the opening of the slot). When a centrifuge tube comprises a lip, preferably the retaining member is
5 arranged to prevent the centrifuge tube from falling through the slot (or being pushed through the depth of the slot).

The retaining member may comprise any suitable and desired mechanism to retain a centrifuge tube in the slot. The retaining member could be attached to a hinge at
10 the end of the slot at the end of the elongate member. However, preferably the retaining member is removable from the elongate member. Being able to separate the retaining member from the elongate member helps to prevent the retaining member from obstructing the opening to the slot when the device is being used to pick up a centrifuge tube. A removable retaining member may also be used to help
15 push a centrifuge tube, located in the slot, out of the slot, e.g. and back into a rack.

The retaining member may be attached to the device, e.g. to bar the opening of the slot, in any suitable and desired way. In one embodiment the elongate member comprises an aperture that extends through (e.g. at least a portion, preferably
20 substantially the whole of) the width of the elongate member at the end of the elongate member in which the slot is formed, wherein the aperture is intersected by the slot, and wherein the retaining member is arranged to be received by (e.g. inserted into) the aperture. Thus preferably the aperture is configured such that when the retaining member is inserted into the aperture, the retaining member bars
25 the opening of the slot, thus preventing a centrifuge tube, located in the slot, from being removed from the slot via its opening.

It will be appreciated that providing a suitable depth for the elongate member allows the aperture to be provided across the width of the end of the elongate member
30 with a reasonable maximum dimension (e.g. diameter) such that the retaining member is not too flimsy and the elongate member is not unduly weakened by the aperture. Thus preferably the aperture has a maximum dimension (e.g. diameter, in a direction perpendicular to the direction in which it extends) of between 2 mm and 8 mm, e.g. between 4 mm and 6 mm, e.g. approximately 5 mm. Thus preferably the
35 (e.g. shaft of the) retaining member has a width (e.g. a diameter) of between 2 mm

- 8 -

and 8 mm, e.g. between 4 mm and 6 mm, e.g. approximately 5 mm, e.g. such that it may be received and retaining by the aperture. Thus preferably the width (e.g. diameter) of the (e.g. shaft of the) retaining member is approximately equal to the width (e.g. diameter) of the aperture in the elongate member.

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Preferably the aperture is arranged such that when the (e.g. shaft of the) retaining member is inserted into the aperture, the distance between the (e.g. the edge of the) retaining member and the terminal end of the slot (e.g. the aperture that is formed in the slot between the retaining member and the terminal end of the slot) is substantially equal to the external diameter of a centrifuge tube. This helps to ensure that a centrifuge tube, located in the slot when the retaining member is inserted through the aperture, is held in the correct position in (e.g. all the way into) the slot. This helps to retain the centrifuge tube in the slot, e.g. owing to the additional friction between the retaining member and the centrifuge tube. It also helps to prevent the centrifuge tube from being pushed (e.g. downwards) out of the slot, e.g. when the centrifuge tube comprises a lip.

Preferably the retaining member comprises a handle portion (e.g. a cylinder having a diameter of approximately 15 mm) which is, e.g., attached to the shaft of the retaining member. This makes the retaining member easier to hold and thus allows it to be used easily, e.g. to push out the centrifuge tube from the slot.

In one embodiment the handling device comprises a shield positioned between the two ends of the elongate member, wherein the shield projects from the elongate member around the perimeter of the elongate member. Providing a shield helps to protect the user's hand from the toxic or radioactive materials that may be in the centrifuge tube.

Preferably the shield projects in a direction perpendicular to the length of the elongate member. Preferably the shield is arranged approximately equidistant between the two ends of the elongate member. The shield may be any suitable and desired size. Preferably the shield projects by at least 10 mm from the (e.g. perimeter of the) elongate member, e.g. at least 15 mm, e.g. approximately 20 mm. Preferably the shield has a depth (e.g. in a direction parallel to the length of the elongate member) of between 1 mm and 5 mm, e.g. approximately 3 mm.

- 9 -

Preferably the shield comprises at least one flat edge, e.g. in a direction parallel to the width of the elongate member. This allows the handling device to be placed stably on a flat surface, e.g. when a centrifuge tube is positioned in the slot of the handling device.

The shield may comprise any suitable and desired shape. Preferably the shield is rectangular, e.g. to match the substantially rectangular cross section of the elongate member.

The shield may be integrally formed with the elongate member of the handling device, e.g. the elongate member and the shield may be made out of the same piece of material. However, in one embodiment the shield is formed separately from the elongate member and they are assembled together to form the handling device.

For example, the shield may be formed with an (e.g. rectangular) aperture therethrough corresponding to the cross sectional shape of the elongate member. The handling device may then be assembled by passing the elongate member through the aperture of the shield and positioning the shield between the two ends of the elongate member.

The device of the present invention may be provided on its own. However, the Applicant has appreciated that the device may be provided with a (e.g. plurality of) centrifuge tube(s) and, e.g., a rack for holding centrifuge tubes. Thus when viewed from a further aspect the invention provides a kit of parts comprising a device in accordance with the present invention, a plurality of centrifuge tubes and/or a centrifuge tube rack.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figures 1a, 1b and 1c show a handling device in accordance with an embodiment of the present invention;

Figures 2a and 2b show use of the device shown in Figures 1a, 1b and 1c with a centrifuge tube; and

Figures 3a and 3b show a handling device in accordance with another embodiment of the present invention.

- 10 -

Centrifuge tubes are used to contain samples which are then placed in centrifuge machines for separation into the different density components of a sample. There are many uses for such centrifuge tubes, including the separation of chemical and biological samples. In some of these uses a sample may contain toxic and/or radioactive material. Embodiments of the present invention provide a handling device for centrifuge tubes that allow a centrifuge tube to be handled while helping to avoid the user coming into contact with the centrifuge tube.

Figures 1a, 1b and 1c show different views of a handling device 1 in accordance with an embodiment of the present invention. The handling device 1 shown in Figures 1a, 1b and 1c is suitable for handling a centrifuge tube having a volume of 1.5 ml. The device 1 comprises an elongate member 2 and a retaining member 4. The retaining member 4 is arranged to be inserted into the elongate member 2, as will be described.

The elongate member 2, which is milled out of an 11 mm thick sheet of PTFE, comprises a handle portion 6 at one end and a slot 8 formed in the other end. Apart from the slot 8, the elongate member 2 is substantially cuboid, with a length of 195 mm, a width of 32 mm and a depth of 11 mm. The slot 8 is cut out of one end of the elongate member 2 and extends into the elongate member 2 towards the other end. The slot 8 has a width of 10 mm, with straight sides and a rounded terminal end.

The slot 8 forms two prongs at the end of the elongate member 2 and a hole 10 of 5 mm in diameter is formed through the width of each of the two prongs. The holes 10 are shaped to receive the retaining member 4, which will now be described.

The retaining member 4 comprises a shaft 12 and a handle portion 14. The shaft 12 of the retaining member 4 has a diameter of 5 mm such that it is able to be received by the holes 10 of the elongate member 2. The handle portion 14 of the slot is a cylinder with a diameter of 15 mm.

Operation of the handling device 1 will now be described with reference to Figures 2a and 2b. Figures 2a and 2b show use of the device 1 shown in Figures 1a, 1b and 1c with a centrifuge tube 20.

- 11 -

Figure 2a shows the handling device 1 with the retaining member 4 removed and thus with the slot 8 open ready to receive a centrifuge tube 20 (which, e.g., may be located in a centrifuge tube rack). When it is desired to pick up the centrifuge tube 20 (e.g. to move it from a rack into a centrifuge), a user holds the end of the elongate member 2 distal from the slot 8 and moves the handling device 1 such that the two prongs either side of the slot 8 engage round the sides of the centrifuge tube 20.

- 10 The elongate member 2 is pushed such that the centrifuge tube 20 is slid to the back of the slot 8 which is rounded such that the centrifuge tube 20 is received snugly. This is further aided by the width of the slot 8 being approximately equal to the diameter of the centrifuge tube 20. Friction alone will therefore hold the centrifuge tube 20 in the slot 8 but the rim around the top of the centrifuge tube 20 prevents the centrifuge tube 20 from dropping or being pushed down through the slot 8.

Once the centrifuge tube 20 is located in the slot 8, the user can hold the handle portion of the retaining member 4 to insert the shaft 12 of the retaining member 4 through the holes 10 in the prongs at the end of the handling device 1. In this configuration, as shown in Figure 2b, the retaining member 4 further secures the centrifuge tube 20 in the slot 8.

15 In the configuration shown in Figure 2b, with the centrifuge tube 20 in the slot 8 of the handling device 1 (such that the bottom of the centrifuge tube 20 projects from the underside of the elongate member 2), the handling device 1 can be placed down on a flat surface (e.g. a laboratory bench) and, owing to the width of the elongate member 2 of the handling device 1, the handling device 1 will be stable, thus keeping the centrifuge tube 20 upright.

20 With the centrifuge tube 20 in the slot 8 of the handling device 1, a user can move the centrifuge tube 20 to, and place the centrifuge tube 20 down in, a different location, e.g. a centrifuge. In order to remove the centrifuge tube 20 from the slot 8 of the handling device 1, the retaining member 4 is removed from the holes 10 in the handling device 1 such that the centrifuge tube 20 can be withdrawn from the

- 12 -

slot 8. The retaining member 4 may also be used to push the centrifuge tube 20 out of the slot 8.

5 All of these features of the handling device 1 mean that the user does not need to touch the centrifuge tube 20, which thus helps to prevent the user's hands from coming into contact with any radioactive and/or toxic substances that may be in the centrifuge tube 20.

10 Another embodiment of a handling device 21 is shown in Figures 3a and 3b. The handling device 21 shown in Figures 3a and 3b is very similar to, and includes all the features of, the handling device 1 shown in Figures 1a, 1b, 1c, 2a and 2b.

15 In addition, the handling device 21 shown in Figures 3a and 3b includes a rectangular shield 23 that projects perpendicularly from the elongate member 22 of the handling device 21, all the way around the elongate member 22 about half way along the length of the elongate member 22. The rectangular shield 23 separates the elongate member 22 into an end at which the slot 24 for a centrifuge tube 25 is located and the opposite end at which a user holds the elongate member 22 to manipulate the handling device 21.

20 Operation of the handling device 21 shown in Figures 3a and 3b is very much the same as the operation of the handling device 1 shown in Figures 1a, 1b, 1c, 2a and 2b. When holding the handling device 21 shown in Figures 3a and 3b, the user holds the portion of the elongate member 22 at the opposite end from the slot 24 in which the centrifuge tube 25 is located, such that the shield 23 protects the user's hand from any toxic or radioactive material in the centrifuge tube 25.

30 It can be seen from the above that in at least a preferred embodiment of the present invention, a handling device for a centrifuge tube is provided that allows a centrifuge tube to be handled safely without a user having to touch the centrifuge tube directly with their hands. Thus, when a centrifuge tube contains toxic and/or radioactive material, the device helps to prevent a user from becoming contaminated with the toxic and/or radioactive material in the centrifuge tube.

- 13 -

While the embodiment of the handling device described above has been described with reference to a particular size of centrifuge tube, the skilled person will appreciate that the handling device of the present invention may be made for handling any suitable and desired size of centrifuge tube, e.g. by providing a
5 suitably sized slot.

Claims

1. A device for handling centrifuge tubes, wherein the device comprises:
5 an elongate member having two ends;
wherein the elongate member comprises a handle portion for holding
the device at one end of the elongate member; and
a slot formed in the opposite end of the elongate member to the
handle portion, wherein the slot is shaped to receive a centrifuge tube.
- 10 2. A device as claimed in claim 1, wherein the centrifuge tube has a volume of
between 0.25 ml and 50 ml, e.g. between 0.5 ml and 10 ml, e.g. between 1 ml and
5 ml, e.g. approximately 1.5 ml.
- 15 3. A device as claimed in claim 1 or 2, wherein the elongate member is
substantially cuboid.
4. A device as claimed in claim 1, 2 or 3, wherein a length of the elongate
member and/or a width of the elongate member and/or a depth of the elongate
20 member is substantially constant over the elongate member.
5. A device as claimed in any one of the preceding claims, wherein the
elongate member has a length that is greater than a width and a depth of the
elongate member, and wherein the width of the elongate member is greater than
25 the depth of the elongate member.
6. A device as claimed in any one of the preceding claims, wherein the length
of the elongate member is between 10 cm and 30 cm, e.g. between 15 cm and 25
cm, e.g. approximately 20 cm, and/or the width of the elongate member is between
30 15 mm and 50 mm, e.g. between 25 mm and 40 mm, e.g. between 30 mm and 35
mm, approximately 32 mm, and/or the depth of the elongate member is between 7
mm and 15 mm, e.g. between 9 mm and 13 mm, e.g. approximately 11 mm.

- 15 -

7. A device as claimed in any one of the preceding claims, wherein the slot extends from the end of the elongate member into the elongate member in the direction in which the elongate member is longitudinally extended.
- 5 8. A device as claimed in any one of the preceding claims, wherein the slot is formed in the end of the elongate member such that this end of the elongate member comprises two prongs with the slot formed therebetween.
9. A device as claimed in any one of the preceding claims, wherein the handle
10 portion and the slot of the elongate member are integrally formed.
10. A device as claimed in any one of the preceding claims, wherein the slot has a uniform depth and/or a uniform depth along substantially the length of the slot.
- 15 11. A device as claimed in any one of the preceding claims, wherein the slot has substantially straight sides.
12. A device as claimed in any one of the preceding claims, wherein the slot
20 comprises a rounded terminal end.
13. A device as claimed in any one of the preceding claims, wherein the width of the slot is approximately equal to the external diameter of a centrifuge tube to be inserted into the slot.
- 25 14. A device as claimed in any one of the preceding claims, wherein the slot has a width of between 5 mm and 15 mm, e.g. between 8 mm and 12 mm, e.g. approximately 10 mm, and/or the slot has a depth of between 7 mm and 15 mm, e.g. between 9 mm and 13 mm, e.g. approximately 11 mm.
- 30 15. A device as claimed in any one of the preceding claims, wherein the elongate member is formed from plastic, e.g. polytetrafluoroethylene (PTFE).
16. A device as claimed in any one of the preceding claims, wherein the elongate member cut out of a sheet of material.

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- 16 -

17. A device as claimed in any one of the preceding claims, wherein the elongate member is substantially rigid.

5 18. A device as claimed in any one of the preceding claims, wherein the device comprises a retaining member arranged to prevent a centrifuge tube, when the centrifuge tube is located in the slot, from being removed from the end of the slot at the end of the elongate member.

10 19. A device as claimed in claim 18, wherein the retaining member is removable from the elongate member.

20. A device as claimed in claim 18 or 19, wherein the elongate member comprises an aperture that extends through the width of the elongate member at the end of the elongate member in which the slot is formed, wherein the aperture is
15 intersected by the slot, and wherein the retaining member is arranged to be received by the aperture.

21. A device as claimed in claim 20, wherein the aperture is configured such that when the retaining member is inserted into the aperture, the retaining member
20 bars the opening of the slot, thus preventing a centrifuge tube, located in the slot, from being removed from the slot via its opening.

22. A device as claimed in claim 20 or 21, wherein the aperture has a maximum dimension of between 2 mm and 8 mm, e.g. between 4 mm and 6 mm, e.g.
25 approximately 5 mm, and a shaft of the retaining member has a width of between 2 mm and 8 mm, e.g. between 4 mm and 6 mm, e.g. approximately 5 mm.

23. A device as claimed in claim 20, 21 or 22, wherein the aperture is arranged such that when the retaining member is inserted into the aperture, the distance
30 between the retaining member and the terminal end of the slot is substantially equal to the external diameter of a centrifuge tube.

24. A device as claimed in any one of claims 18 to 23, wherein the retaining member comprises a handle portion.

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- 17 -

25. A device as claimed in any one of the preceding claims, further comprising a shield positioned between the two ends of the elongate member, wherein the shield projects from the elongate member around the perimeter of the elongate member.

- 5 26. A kit of parts comprising a device as claimed in any one of the preceding claims, a plurality of centrifuge tubes and/or a centrifuge tube rack.

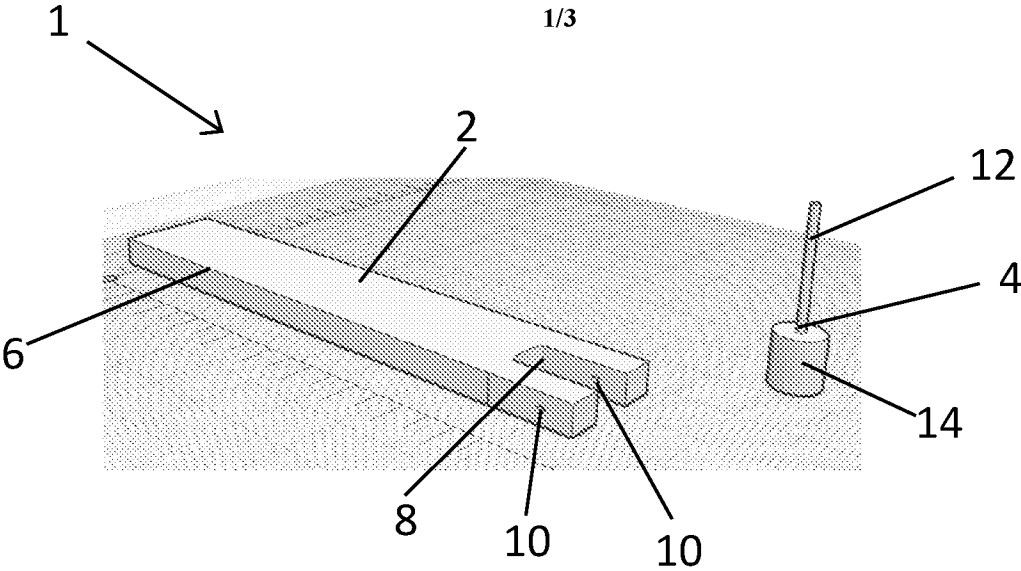


Figure 1a

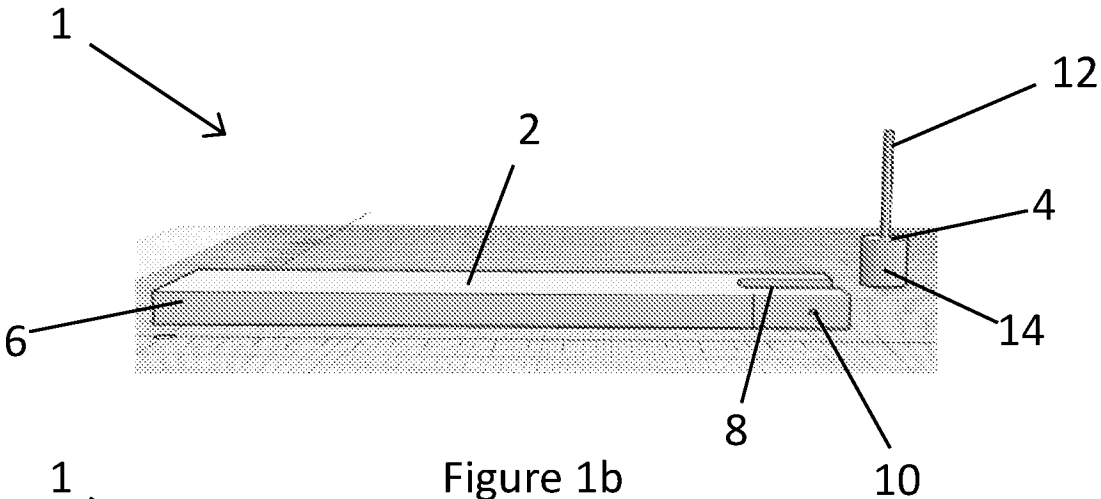


Figure 1b

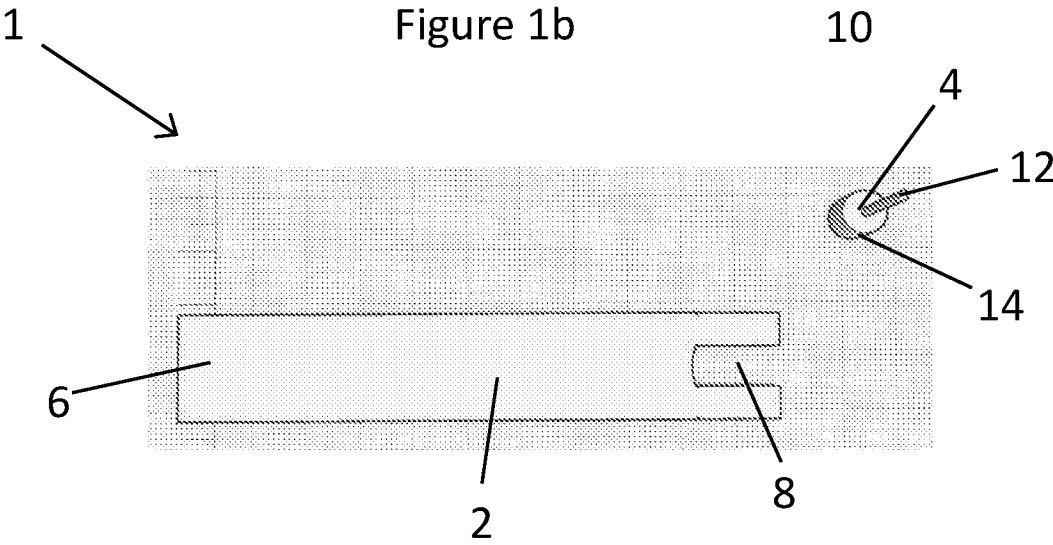
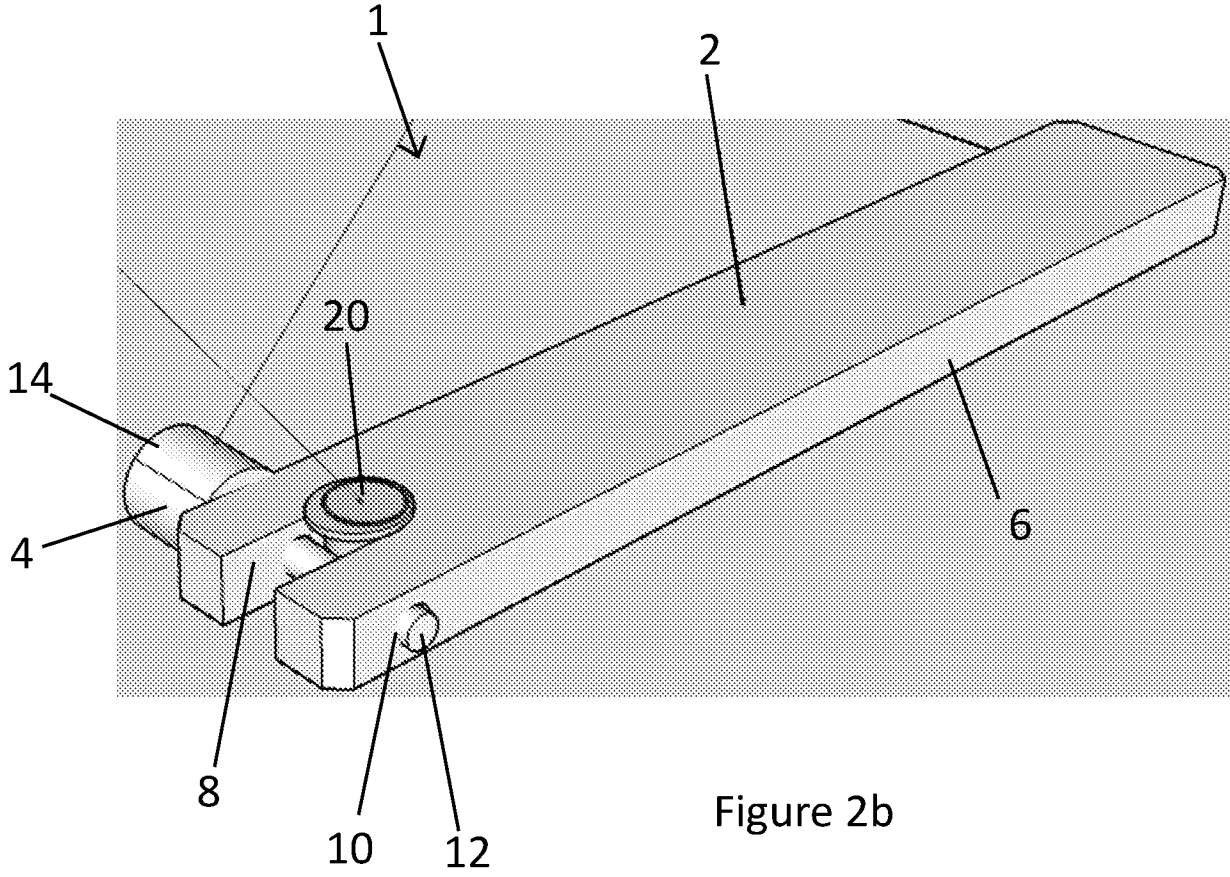
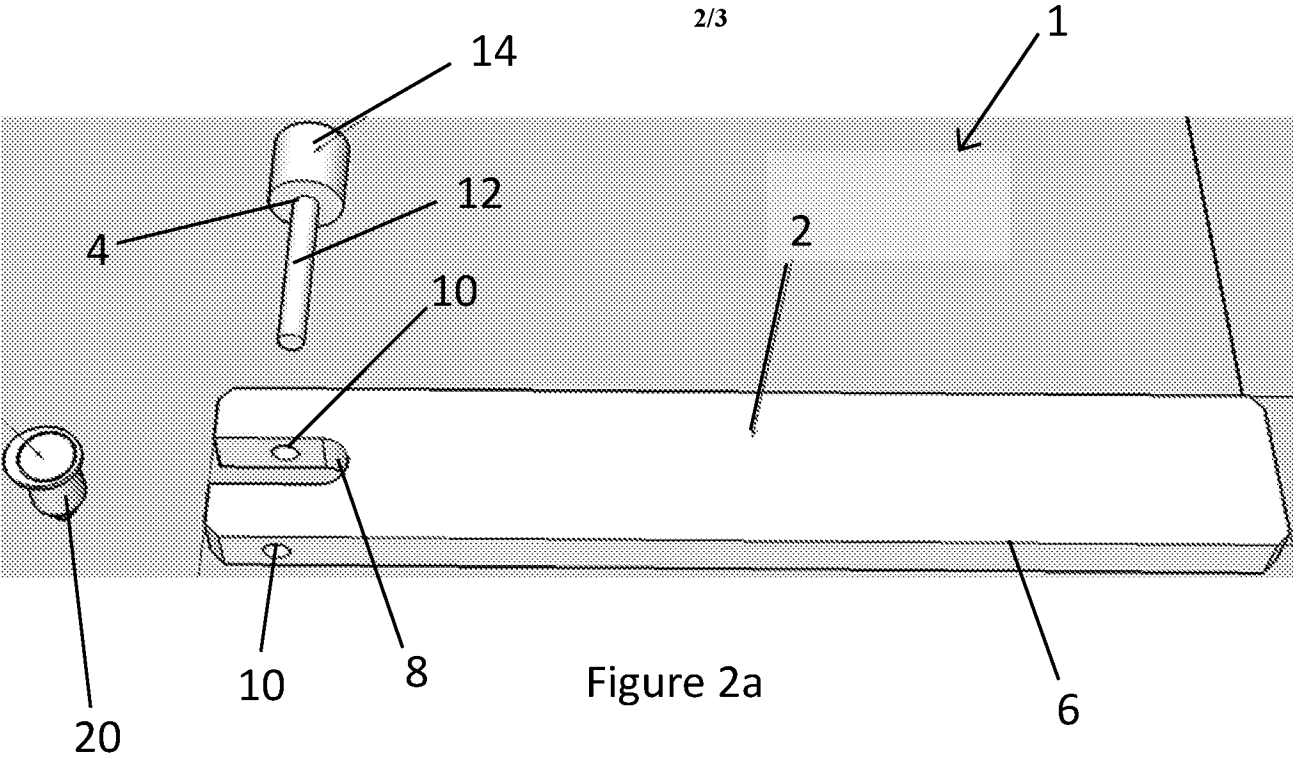


Figure 1c

2/3



3/3

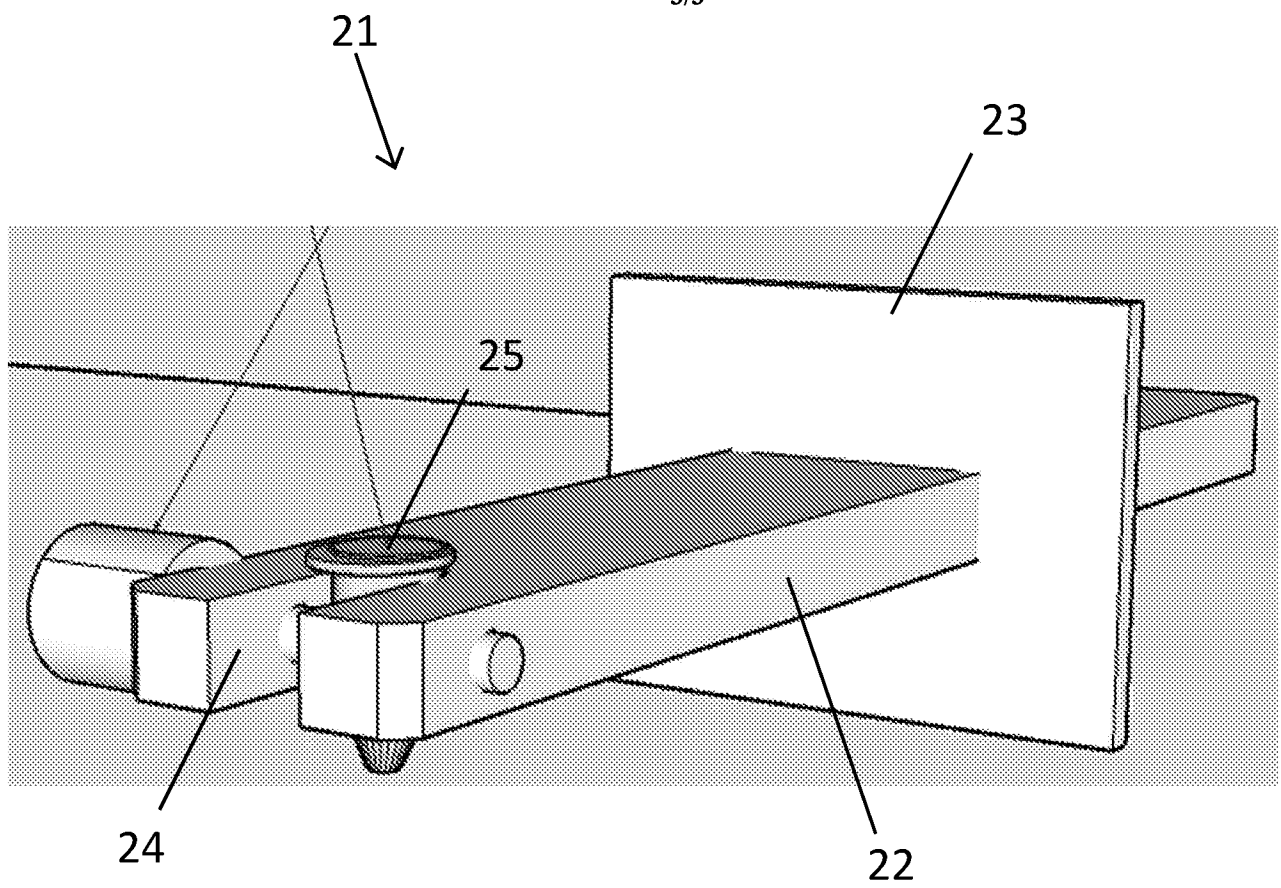


Figure 3a

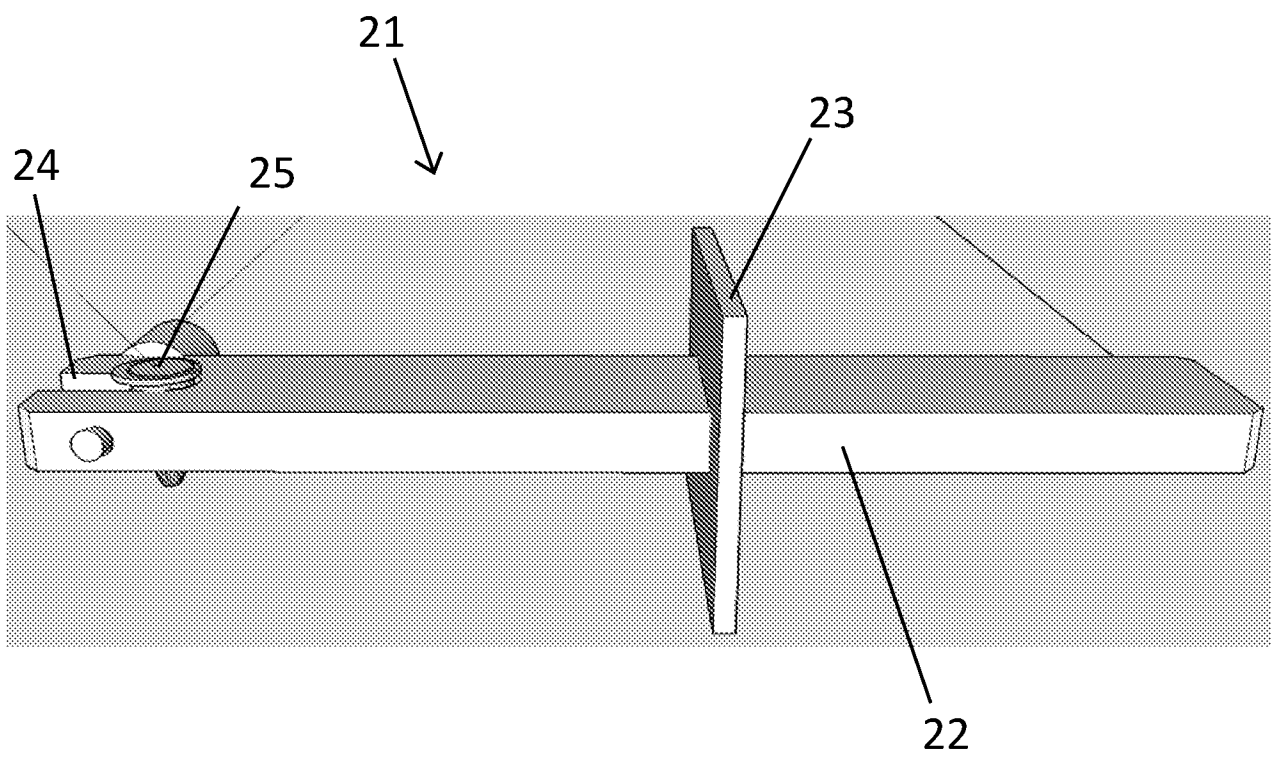


Figure 3b

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2018/052026

A. CLASSIFICATION OF SUBJECT MATTER
INV. B01L9/06 B01L3/00 B01L9/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2 608 433 A (JEAN MARBEUF ARMAND) 26 August 1952 (1952-08-26) column 1, line 35 - column 2, line 3; figures 1, 2 figure 2	1-17,26
X	US 2004/141881 A1 (FRANK MARTIN [DE] ET AL) 22 July 2004 (2004-07-22)	1-19,26
Y	paragraph [0046] - paragraph [0048]; figure 1 paragraph [0051] - paragraph [0054]; figures 5, 6	20-24
X	US 2009/155127 A1 (KOPOIAN MARC S [US]) 18 June 2009 (2009-06-18) paragraph [0025] - paragraph [0036]; figures 1-6	1-19,26
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Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

8 October 2018

Date of mailing of the international search report

15/10/2018

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Authorized officer

Ueberfeld, Jörn

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2018/052026

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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Y	US 3 185 509 A (GEORGE WELSHER RONALD ANDREW ET AL) 25 May 1965 (1965-05-25) column 1, line 42 - line 66; figures 2, 3 -----	20-24
Y	US 2 429 305 A (BARNES MARION D) 21 October 1947 (1947-10-21) column 2, line 38 - line 47; figures 1 - 4 -----	20-24

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International application No

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