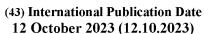
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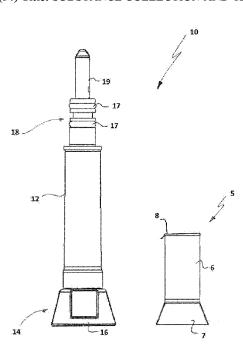


FIG. 1

(57) Abstract: A device for collecting and testing a sample for the presence of an analyte, the device comprising: a body, having an elongate hollow portion, distal tip portion and an intermediate portion connecting the elongate hollow portion to the distal tip portion; an absorbent member mounted on the distal tip portion for obtaining a sample for testing; a test member configured to be inserted into the elongate hollow portion for testing a sample solution containing the sample; and a buffer solution holder having a volume of buffer solution contained therein for forming the sample solution for testing; wherein, the intermediate portion is configured to sealingly engage with the buffer solution holder upon insertion of the distal tip portion into the buffer solution holder such that further advancement of the distal tip portion into the buffer solution holder will force the buffer solution to pass through the absorbent member and lyse any analyte present in the sample into the sample solution whereby the sample solution is further forced through the intermediate portion and the elongate hollow portion to be received by the test member for testing.



SUBSTANCE COLLECTION AND TESTING DEVICE

RELATED APPLICATIONS

The present application claims priority from Australian Provisional Patent Application No. 2022900938 filed on 8 April 2022, the entire contents of which are incorporated herein by reference.

FIELD OF INVENTION

The present invention relates generally to a device for collecting and testing for the presence of a substance, and in particular, to a device for testing a fluid sample for the presence or absence of at least one analyte.

10 BACKGROUND OF THE INVENTION

In a variety of situations, especially medical diagnostics, there is often a need to provide for a rapid collection of fluids for testing for the presence or absence of an analyte. In such situations, the testing process needs to be rapid and accurate such that upon detection or otherwise of an analyte in the fluid, an appropriate action can be taken without delay to ensure efficiency in procedure and process.

In recent times, the Covid 19 pandemic has shown the importance of providing a rapid and accurate testing process to the public health system. Individuals infected with a virus may have no symptoms but may be infectious to the general population, as such, it is important for individuals infected with a virus to be identified and isolated where possible. Conventional laboratory analysis and diagnostic systems are accurate, but there is a significant delay between obtaining the sample for analysis and receiving the diagnostic results, as the sample must be transported to a laboratory for analysis. Due to the delay, individuals may be forced to quarantine until they receive the results of the test, which can significantly inconvenience the individual, especially if the results are negative. This can also act as a deterrent for other individuals to undergo testing, which can result in infected individuals being exposed in the public.

To address this issue the provision of rapid test kits has proven effective to provide a means for individuals to self-test for the presence of the virus, with the results of the test being available within minutes of undertaking the test. Rapid test kits typically employ multiple components to collect the sample and to prepare the sample for testing. A testing cassette is also provided that is configured to perform the test and display the results to the user. Typically, such kits are assembled by

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the user prior to testing and are provided with instructions to assist the user in correctly performing the necessary tasks to conduct the test. Swabs, such as nasal or saliva swabs, are provided for use by the user to collect a fluid specimen for testing. Such swabs can be difficult to correctly use and can be painful, resulting in sub-optimal specimen collection that can compromise the integrity of the test. Similarly, as the test kits require the user to assemble multiple parts prior to use, there is an increased possibility of the components becoming contaminated through incorrect handling and/or incorrect assembly, further comprising the integrity of the testing process.

Thus, there is a need to provide for a more user friendly testing device that obviates the need for assembling multiple parts and which provide for a more comfortable to use device for obtaining the sample for testing, whilst ensuring the integrity of the test results.

The above references to and descriptions of prior proposals or products are not intended to be, and are not to be construed as, statements or admissions of common general knowledge in the art. In particular, the above prior art discussion does not relate to what is commonly or well known by the person skilled in the art, but assists in the understanding of the inventive step of the present invention of which the identification of pertinent prior art proposals is but one part.

20 STATEMENT OF INVENTION

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The invention according to one or more aspects is as defined in the independent claims. Some optional and/or preferred features of the invention are defined in the dependent claims.

Accordingly, in one aspect of the invention there is provided a device for collecting and testing a sample for the presence of an analyte, the device comprising:

a body, having an elongate hollow portion, distal tip portion and an intermediate portion connecting the elongate hollow portion to the distal tip portion;

an absorbent member mounted on the distal tip portion for obtaining a sample for testing;

a test member configured to be inserted into the elongate hollow portion for testing a sample solution containing the sample;

a buffer solution holder having a volume of buffer solution contained therein for forming the sample solution for testing;

wherein, the intermediate portion is configured to sealingly engage with the buffer solution holder upon insertion of the distal tip into the buffer solution holder

such that further advancement of the distal tip into the buffer solution holder will force the buffer solution to pass through the absorbent member and lyse any analyte present in the sample into the sample solution whereby the sample solution is further forced through the intermediate portion and the elongate hollow portion to be received by the test member for testing. The test member may comprise a testing strip having a lateral flow assay that is in fluid communication with the distal tip portion to detect the presence of an analyte in the sample solution.

The absorbent member may be a sponge and the distal tip portion may comprise a spindle member for receiving the sponge thereon.

The spindle member may comprise a plurality of recesses formed therein to collect the sample and to facilitate mixing of the sample with the buffer solution.

The buffer solution holder may be in the form of a tubular reservoir containing the volume of buffer solution. The tubular reservoir may contain around 1.0 - 1.2 ml of buffer solution.

- The tubular reservoir may be sealed prior to use by a seal member. The seal member may be formed from a PET/aluminium foil material affixed to an opening of the tubular reservoir. The internal walls of the tubular reservoir may be configured to sealingly engage with the intermediate portion as the intermediate portion is inserted therein.
- The intermediate portion may have one or more seal members provided thereon to form a seal between the intermediate portion and the tubular reservoir to form an enclosed environment into the distal tip portion and the buffer solution are contained. In this arrangement, upon further insertion of the intermediate member into the tubular reservoir, which the enclosed environment becomes pressurised to force the buffer solution through the absorbent member to lyse any analyte present in the sample into the sample solution.

The test member may comprise a cylindrical body portion for insertion into the elongate hollow portion of the body. The cylindrical body portion of the test member may have at least one channel formed along a length thereof. The at least one channel may configured to receive a testing strip for testing the sample solution.

In another embodiment, the cylindrical body portion may have multiple channels formed along a length thereof and each channel is configured to receive a testing strip for testing the sample solution.

The testing strip may extend substantially along a length of the cylindrical body portion of the test member such that an end portion of the testing strip projects beyond an end of the cylindrical body portion. The end portion of the testing strip may be positioned within the elongate hollow portion to receive the sample solution as it enters the elongate hollow portion.

BRIEF DESCRIPTION OF THE DRAWINGS

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The invention may be better understood from the following non-limiting description of preferred embodiments, in which:

- Fig. 1 is a plan view depicting the device of the present invention in accordance with one embodiment:
 - Fig. 2A is a plan view of the main body portion of the device of Fig. 1 suitable for obtaining a saliva sample;
 - Fig. 2B is a plan view of the main body portion of the device of Fig. 1 suitable for obtaining a nasal sample;
- Fig. 2C is a plan view depicting the test member of the device of Fig. 1 in isolation;
 - Fig. 3 is a side view depicting the main body portion of the device of Fig. 1 in a partially exploded form;
 - Fig. 4 is a side view of the test member of the device of Fig. 1 in a partially exploded form;
 - Fig. 5 is a perspective view of a fluid transfer path for facilitating controlled flow of a sample solution within the device of Fig. 1;
 - Fig. 6 is a perspective bottom view of the fluid transfer path of Fig. 5;
- Fig. 7 is a perspective view of an inlet of the main body of the device of Fig. 1; and
 - Fig. 8 is cross-sectional view of the distal end and intermediate portion of the device of Fig. 1.

DETAILED DESCRIPTION OF THE DRAWINGS

Preferred features of the present invention will now be described with particular reference to the accompanying drawings. However, it is to be understood that the

features illustrated in and described with reference to the drawings are not to be construed as limiting on the scope of the invention.

The present invention will be described below in relation to the application of the device to collect and test a bodily fluid sample taken from an individual for the presence of a protein or similar analyte indicative of the presence of a virus or the like. However, it will be appreciated that the device of the present invention can be employed for collecting and testing for a variety of different purposes other than disease detection, including analysing fluids for the presence of toxins, explosive materials, peptides, micro-organisms, amino acids, steroids, illicit drugs and various other analytes as will be appreciated by those skilled in the art.

Referring to Fig. 1, a device 10 in accordance with an embodiment of the present invention is depicted. The device 10 generally comprises a main body 12 in the form of a hollow chamber within which a holder member 14 is received. The holder member 14 is shown in isolation in Fig. 2C and comprises a cylindrical body portion 15 extending from a base portion 16. As is shown in Fig. 1, the cylindrical body portion 15 is contained within the main body 12 and the base portion 16 extends from the main body 12 to function as a stand for positioning the device 10 in an upright manner as depicted.

An intermediate portion 18 extends from an upper end of the main body 12. An absorbent member 19 is mounted to a distal end of the intermediate portion 18 to be located over a spindle member 20 extending from the intermediate portion 18. The absorbent member 19 is in the form of an elongate sponge that is able to be inserted into a fluid source, such as a nasal cavity or mouth of a user to collect a sample of nasal fluid or saliva. The absorbent member 19 is capable of absorbing and retaining fluid within the structure of the absorbent material thereof for testing, in a manner as will be discussed in more detail below.

A buffer solution holder 5 is provided to contain a predetermined amount of buffer solution for preparing the fluid sample for testing. The holder 5 is in the form of a tubular reservoir 6 mounted on a base 7. The tubular reservoir 6 contains a predetermined volume of buffer solution, in a preferred form, the tubular reservoir contains around 1.0 - 1.2 ml of buffer solution. The buffer solution may include a saline solution, a saliva DNA preservation buffer, guanidinium thiocyanate (GTC) or guanidinium isothiocyanate (GITC) solutions (which are chemical compounds which may be used as a general protein denaturant, being a chaotropic agent, although most commonly used as a nucleic acid protector in the extraction of DNA and RNA from cells), sodium citrate, a citrate-containing buffer, sodium

azide, virus cell-lyse storage buffer (e.g., a buffer having a lysis effect on, for example, a virus, while preserving RNA information), and the like. Such buffer solutions are well known in the art.

Prior to use, the tubular reservoir 6 contains the buffer solution and the opening of the tubular reservoir 6 is sealed by a seal member 8, which may be formed from a PET/aluminium foil material adhered, or otherwise affixed, to the opening of the tubular reservoir 6. The internal walls or surface (not shown) of the tubular reservoir 6 is shaped to receive the absorbent member 19 and the intermediate portion 18 of the main body 12, when the seal member 8 is removed via a peel strip, or penetrated using the distal tip portion of the spindle 20. The intermediate member 19 may have one or more O-ring seal members 17 mounted thereon such that when the absorbent member 19 and the intermediate member 18 are plunged into the tubular reservoir 6, a seal is formed between the intermediate member 18 and the tubular reservoir 6 to facilitate an enclosed and pressurised environment to promote transfer of the sample fluid present on the absorbent member 19 with the buffer solution, in the manner as will be discussed in more detail below.

As is shown in Fig. 2A and 2B, depending on the application of the device 10, the configuration of the spindle 20 may vary. In Fig. 2A, the device 10 is configured for use as a saliva sample collector with the spindle 20 having multiple recesses 21 formed about the periphery thereof. Each of the recesses 21 are fluid pockets formed in the spindle 20 below the sponge 19 to ensure that a sufficient fluid sample is collected by the device 10 prior to the transfer of test fluid into the holder member 14 for testing in a manner to be described in more detail below. When used as a saliva sample collector, the spindle 20 with the sponge 19 mounted thereon may be positioned under the subject's tongue to sufficiently collect the saliva sample.

Similarly, in Fig. 2B the device 10 is configured for use as a nasal sample collector with the spindle 20 being longer to accommodate a longer absorbent member for accessing the user's nasal cavity. The spindle 20 may also have recesses 22 formed therein to facilitate delivery of the sample fluid therethrough and into the holder member 14, as will be discussed in more detail below. When used as a nasal sample collector, the spindle 20 with the sponge 19 mounted thereon may be simply swirled around the subject's nostril to sufficiently collect the nasal sample.

Referring to Fig. 2C and Fig. 4, the holder member 14 is depicted. As is shown, the cylindrical body portion 15 of the holder member 14 has a channel 24 formed along a length thereof. The channel 24 is configured to receive a testing strip 25

for testing the fluid in the manner to be described below. In the embodiment as depicted only one channel 24 is provided, however, multiple channels may be provided to facilitate testing the sample for the presence of different analytes, as required. When mounted to the channel 24, the testing strip 25 extends substantially the length of the cylindrical body portion 15 of the holder member 14 to project above a top end of the cylindrical body portion 15, as shown.

The testing strip 25 may be a lateral flow test strip type, which are well known in the art to provide disposable diagnostic devices that can test for drugs, diseases (e.g., viruses) and other biomarkers and analytes in samples such as saliva, blood, urine, and the like. The testing strip 25 may comprise a nitrocellulose or similar membrane-type strip that contains test and control lines for providing a visual indication of the results of the testing procedure. The testing strip 25 is configured to facilitate capillary flow of the specimen along the strip 25 through a wicking action, as will be appreciated by those skilled in the art.

As is shown in Fig. 3, the main body 12 of the device 10 is shown in a partially exploded form. The absorbent member 19 is shaped to fit over the spindle member 20. O-rings 17, preferably made from a silicon material, are configured to be received between ridges 13 formed about the intermediate portion 18, as shown.

As is shown in more detail in Fig, 8, a fluid transfer path 30 is formed within the intermediate member 18 of the main body 12. The fluid transfer path 30 is shown in isolation in Fig. 5 and Fig. 6 and comprises a head portion 32 defining a cylindrical space for receiving a filter 28 and a plurality of leg members 34 projecting from an underside of the head portion 32. In the embodiment as depicted, four hollow leg members 34 are arranged in quadrant segments to provide a path through which the sample fluid will flow from the spindle 20 to the filter 28 located in the head portion 32 of the fluid transfer path 30. Alternatively, other sample fluid paths in the form of tunnels and the like may be provided to facilitate fluid transfer between the spindle 20 and the main body 12, without departing from the novel subject matter described herein.

The filter 28 is provided in the head portion 32 of the fluid transfer path 30 to filter particulate matter from the sample fluid as it flows into the main body 12. As is shown in Fig. 7, for reasons of clarity, the four hollow leg members 34 have been removed from the head portion 32 of the fluid transfer path 30 to show the inlets 36 that provide fluid access into the main body 12. This ensures that the sample fluid can pass along the fluid transfer path 30 and into the central bore of the main body 12.

When the holder member 14 is inserted into the end of the main body 12, the distal end of the testing strip 25 is positioned in direct fluid communication with the head portion 32 of the fluid transfer path 30, such that the sample fluid entering the head portion 32 of the fluid transfer path 30 is in fluid communication with the end of the testing strip 25. The end of the testing strip 25 may be treated to neutralize the sample fluid such that it can flow along the testing strip 25, which may be treated to contain nanoparticles having an antibody on their surface that are released and mix with the sample fluid. Any target analytes in the sample fluid that correspond to the antibody, bind to the antibody and flow with the sample fluid through the testing strip 25. As the sample fluid passes over one or more test lines and control lines formed in the testing strip 25, immobilized proteins present in the test lines and control lines bind to the nanoparticle to generate a visual signal that is correlated to the presence of the target analyte in the sample fluid. The sample fluid will continue to flow along the testing strip 25 where it will cross a control line. The control line may be treated to contain ligands that will bind with the nanoparticle conjugate whether or not there is analyte present in the sample fluid, to confirm that the lateral flow assay of the testing strip 25 has worked correctly. Such a testing strip configuration is well understood by those of skill in the art. It will be understood that the use of such a lateral flow assay testing strip may be configured to test one, two or more than two target analytes in the sample fluid.

To determine the result of the analysis, after a predetermined time, the holder member 14 can be removed from the main body 12 to view the testing strip 25. This enables the result of the test to be determines, namely whether the analyte was present or not within the sample fluid. The main body 12 and the holder member 14 may then be disposed of.

It will be appreciated that the system of the present invention provides an improved sampling system due to the interaction between the intermediate portion 18 and the buffer solution holder 5 to create lysis of the cells present in the sample, after a nasal or saliva swab has been taken from a subject. This is due to the sealed manner in which the intermediate portion 18 engages with the inner walls of the tubular reservoir 6 of the buffer solution holder 5. In this regard, as the intermediate portion 18 is plunged into the buffer solution holder 5, the absorbent member 19 and the spindle 20 take up the space in the buffer solution holder within which the buffer solution is contained. As this occurs, a plunge pressure force is created in the sealed space formed between the intermediate portion 18 and the holder 5. This pressure increases as the intermediate portion 18 continues to be inserted into the holder 5 thereby causing the buffer solution to rapidly pass through the absorbent member 19 and through the recesses formed in the spindle

20. Such pressurised movement of the buffer solution through the absorbent member functions to lyse the cells from the sample present on/in the absorbent member 19. The lysed cells entrained within the test fluid will then be delivered via the fluid transfer path 30 to the testing strip 25 as a fluid sample. As the fluid sample is forced into the head portion 32 of the fluid transfer path 30, it comes in direct contact with end of the testing strip 25. Thus, the pressure applied by the user pushing the intermediate portion 18 down into the buffer solution holder 5 forces the fluid sample into fluid communication with the testing strip 25.

It will be appreciated that the device of the present invention avoids the need to assemble several individual pieces to perform a test device. Rather, the device of the present invention provides a single device that is intuitive to use and which functions to lyse the cells from the sample in a simple motion.

It will also be appreciated that, whilst the above embodiments were described in relation to testing a nasal or saliva swab for analytes indicating the presence of a virus or disease in a subject, the present device may used for a vast array of diagnostics, the most obvious being human healthcare but also food production, animal husbandry and veterinary applications.

Throughout the specification and claims the word "comprise" and its derivatives are intended to have an inclusive rather than exclusive meaning unless the contrary is expressly stated or the context requires otherwise. That is, the word "comprise" and its derivatives will be taken to indicate the inclusion of not only the listed components, steps or features that it directly references, but also other components, steps or features not specifically listed, unless the contrary is expressly stated or the context requires otherwise.

- Orientational terms used in the specification and claims such as vertical, horizontal, top, bottom, upper and lower are to be interpreted as relational and are based on the premise that the component, item, article, apparatus, device or instrument will usually be considered in a particular orientation, typically with the device uppermost.
- It will be appreciated by those skilled in the art that many modifications and variations may be made to the methods of the invention described herein without departing from the spirit and scope of the invention.

The claims defining the invention are as follows:

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1. A device for collecting and testing a sample for the presence of an analyte, the device comprising:

a body, having an elongate hollow portion, distal tip portion and an intermediate portion connecting the elongate hollow portion to the distal tip portion;

an absorbent member mounted on the distal tip portion for obtaining a sample for testing;

a test member configured to be inserted into the elongate hollow portion for testing a sample solution containing the sample; and

a buffer solution holder having a volume of buffer solution contained therein for forming the sample solution for testing;

wherein, the intermediate portion is configured to sealingly engage with the buffer solution holder upon insertion of the distal tip portion into the buffer solution holder such that further advancement of the distal tip portion into the buffer solution holder will force the buffer solution to pass through the absorbent member and lyse any analyte present in the sample into the sample solution whereby the sample solution is further forced through the intermediate portion and the elongate hollow portion to be received by the test member for testing.

- 2. A device according to claim 1, wherein the test member comprises at least one testing strip having a lateral flow assay that is in fluid communication with the distal tip portion to detect the presence of one or more analytes in the sample solution.
- A device according to claim 1, wherein the absorbent member is a sponge and the distal tip portion comprises a spindle member for receiving the sponge thereon.
 - 4. A device according to claim 3, wherein the spindle member comprises one or more recesses formed therein to collect the sample and to facilitate mixing of the sample with the buffer solution.
 - 5. A device according to claim 1, wherein the buffer solution holder is in the form of a tubular reservoir containing the volume of buffer solution.
 - 6. A device according to claim 5, wherein tubular reservoir contains around 1.0 1.2 ml of buffer solution.
- 35 7. A device according to claim 6, wherein the tubular reservoir is sealed by a

seal member.

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8. A device according to claim 7, wherein the seal member is formed from a PET/aluminium foil material affixed to an opening of the tubular reservoir.

- 9. A device according to claim 5, wherein internal walls of the tubular reservoir are configured to sealingly engage with the intermediate portion as the intermediate portion is inserted therein.
 - 10. A device according to claim 9, wherein the intermediate member has one or more seal members provided thereon to form a seal between the intermediate member and the tubular reservoir to form an enclosed environment into the distal tip portion and the buffer solution are contained.
 - 11. A device according to claim 10, wherein upon further insertion of the intermediate member into the tubular reservoir, which the enclosed environment becomes pressurised to force the buffer solution through the absorbent member to lyse any analyte present in the sample into the sample solution.
 - 12. A device according to claim 1, wherein the test member comprises a cylindrical body portion for insertion into the elongate hollow portion of the body.
- 13. A device according to claim 12, wherein cylindrical body portion of the test member has at least one channel formed along a length thereof.
 - 14. A device according to claim 13, wherein the at least one channel is configured to receive a testing strip for testing the sample solution.
 - 15. A device according to claim 13, wherein the cylindrical body portion has multiple channels formed along a length thereof and each channel is configured to receive a testing strip for testing the sample solution.
 - 16. A device according to claim 14 or claim 15, wherein the testing strip extends substantially along a length of the cylindrical body portion of the test member such that an end portion of the testing strip projects beyond an end of the cylindrical body portion.
- 30 17. A device according to claim 16, wherein the end portion of the testing strip is positioned within the elongate hollow portion to receive the sample solution as it enters the elongate hollow portion.

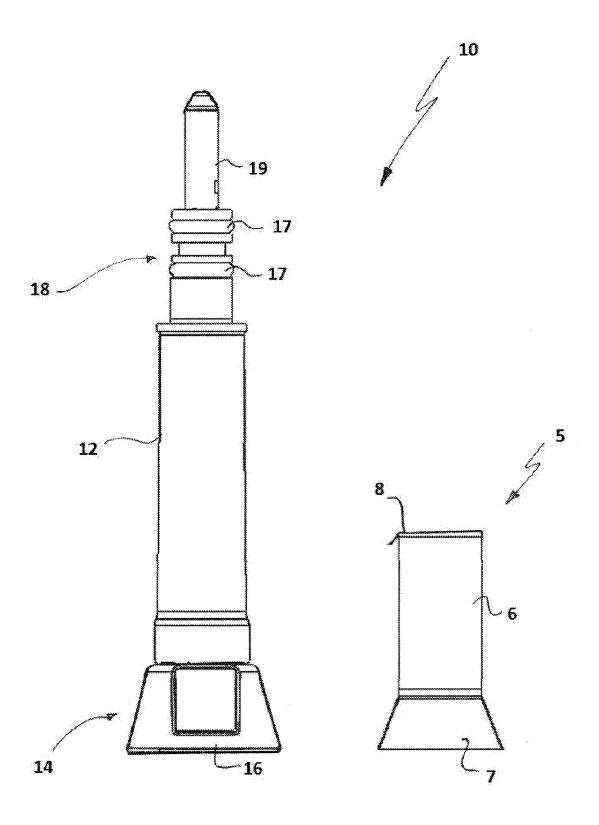
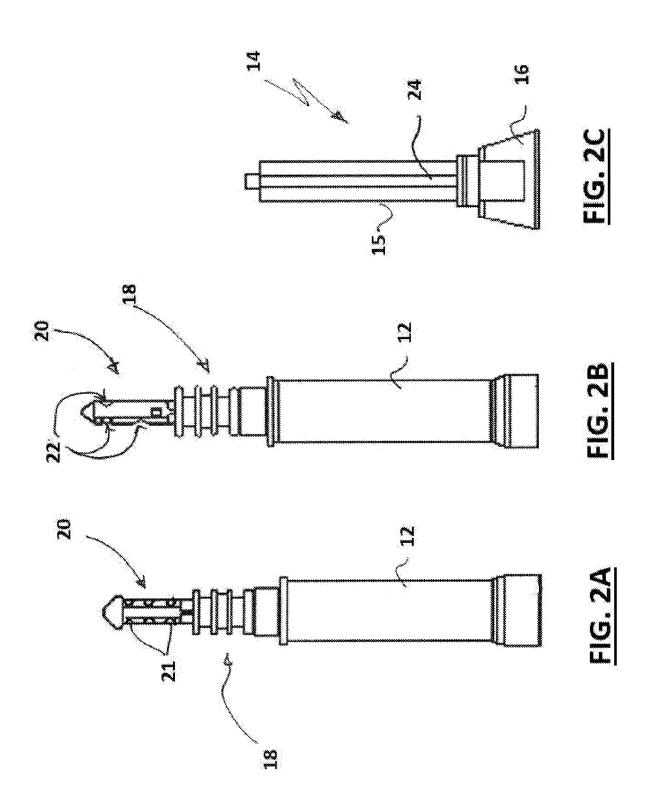
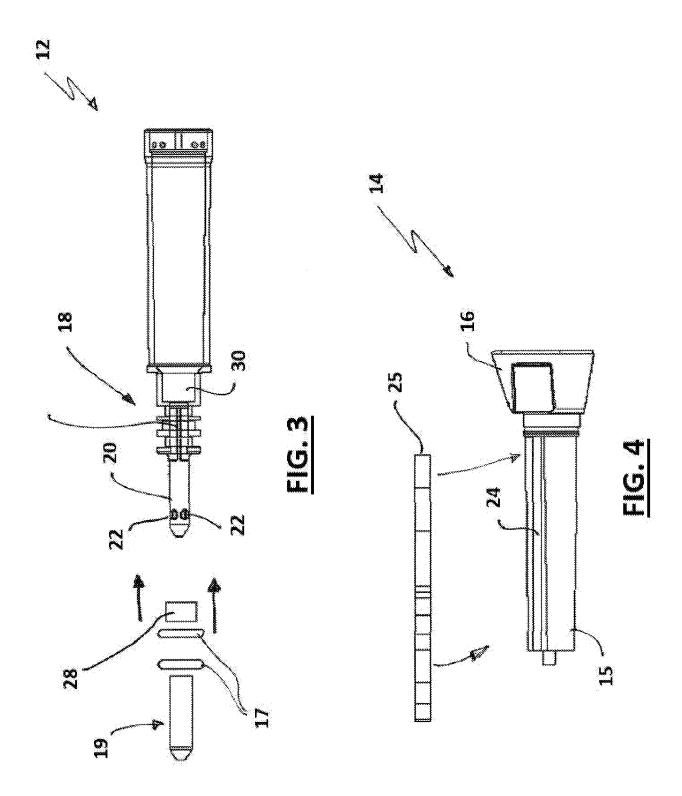
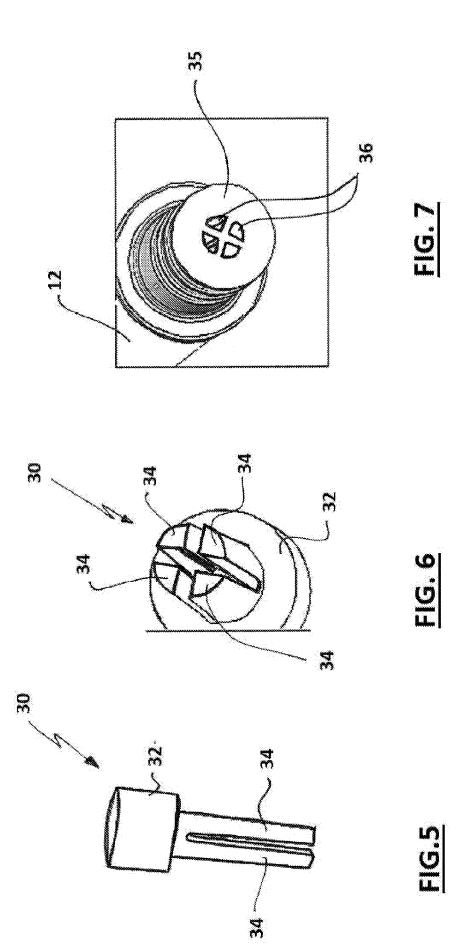


FIG. 1







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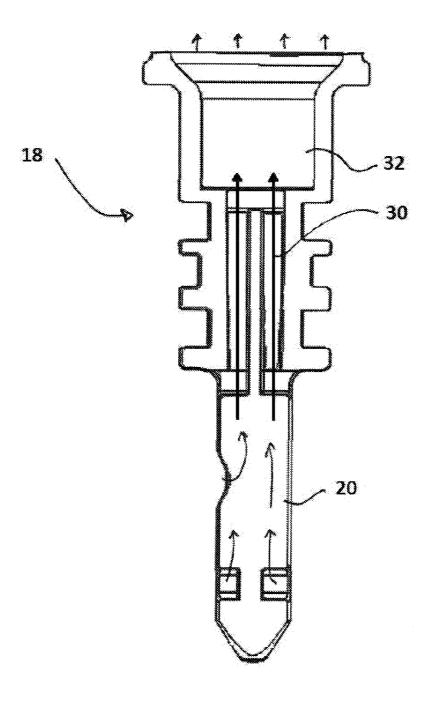


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2023/050284

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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)

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)

Google Patents and Google Scholar: Keywords: substance collection and testing device, analyte testing device, Rapid antigen test kit, Rapid Covid test kit, Corona virus test kit, disposable covid test kit, SARS test kit, Corona virus diagnostic test kit, analyte detection device, COVID-19 test, analyte diagnostic kit, lateral flow test, lateral flow device, lateral flow assay, lateral flow immunoassay, rapid test kit, covid quick test, covid test strip, Lateral flow test – covid – buffer; Rapid covid kit – buffer solution –

PATENW: IPC/CPC - G01N33/48, G01N21/77, C12Q1/68, B01L3/50, B01L3/52, G01N1/10, A61B10/00.

Keywords: test/diagnostic/detection - covid/corona/sars/virus/antigen - kit - swab - absorbing member/section/material/ layer/region/zone - test/assay/detection - member/strip/region/slide/system/device/apparatus/cassette/strip - buffer/reagent solution - holder/container, interconnect portion/member or part.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

X Further documents are listed in the continuation of Box C X See patent family annex									
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance of document cited by the applicant in the international application earlier application or patent but published on or after the international filing date "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone									
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- document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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- document member of the same patent family

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C (Continuat		ternational application No.		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	R	Relevant to claim No.	
X	Youtube video of "All-in-One Rapid COVID-19 Antigen Saliva Pen" <url: <a="" href="https://www.youtube.com/watch?v=Kd6flXcoMes">https://www.youtube.com/watch?v=Kd6flXcoMes published on 22 April 2021 Video title, Video at 10 sec, Video time range of 1:05 - 1:30 min</url:>		1-17	
X	US 2020241020 A1 (Becton, Dickinson and Company, Franklin Lake, NJ (US)) 30 July 2020 Abstract, Figures 5A-D, 6A-E, Para [0025], Para [0066], [0072]–[0079], Para [0082]		1-2 and 5-15	

INTERNATIONAL SEARCH REPORT

International application No.

Information on patent family members

PCT/AU2023/050284

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document/	s Cited in Search Report	Patent Family Member/s					
Publication Number	Publication Date	Publication Number	Publication Date				
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US 2020241020 A1	30 July 2020	US 2020241020 A1	30 Jul 2020				
		US 11280801 B2	22 Mar 2022				
		AU 2020215639 A1	05 Aug 2021				
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		US 2022206021 A1	30 Jun 2022				
		WO 2020159790 A1	06 Aug 2020				
		End of Annex					