NATIONAL OFFICE FOR TECHNOLOGY ACQUISITION AND PROMOTION

(FEDERAL MINISTRY OF SCIENCE AND TECHNOLOGY)

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Technology Acquisition and Research Coordination Department

NOTAP/IPR/493D/17

20th August, 2024

The Vice Chancellor
Bayero University, Kano
PMB 3011, BUK, Kano
Kano State

Dear Sir,

RE: REQUEST FOR PATENT ASSISTANCE

I am directed to acknowledge the receipt of your letter dated 19th July, 2024 with the patent application title "**Eco-Friendly Reusable Menstrual Pad with Enhanced Absorbency and Comfort**".

2. I am further directed to inform you that during the preliminary evaluation of your patent application, the following were observed: -

(i) **The patent application form:** the patent application form was not completed as required. Kindly clarify the following with reference to the sample provided: -

a. Based on your institutional Intellectual Property (IP) Policy who owns the patent right? Is it solely owned by the institution or co-owned with the researchers?

b. The application form must be type-filled and should be appropriately completed as required (see attached sample provided in paragraph 3III).

(ii) **The title**: The title needs to be clear, concise and as specific as possible indicate the subject of the invention. It is therefore recommended that the title of the invention be changed to "**Reusable Menstrual Pad with Enhanced Absorbency and Comfort**" to reflect the invention.

(iii) **The patent specification:** the patent specification (document) did not properly and thoroughly develop vital aspects of the invention, which restricts the application inventive potentiality and also limits the scope of protection. Consequently, the possibility of filing the application at the Patent Office is not in view. It is important to note that an invention is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. Specific issues relating to your submission includes: -

a. The relevant sub-headings and arrangement – Relevant subheadings *(such as abstract, technical field, background of the invention, summary of the invention, brief description of the drawings, detailed description of the invention etc.)*, the content required in each of the sections were not adequately developed in the patent application document. Therefore, there is need for the documentation of the substantial technical information flows in these format/subheadings to establish the invention. It is also important to limit the subheadings to the one seen in item I and IV in paragraph 3 as guide.

b. **The Abstract** – An abstract is a brief summary of your invention in **one paragraph**, and should include all the important technical features of your invention not just the result of the research. It should be drafted in a manner that allows a clear understanding of the technical problem to be solved and the solution to that problem, namely your invention.

c. **The technical field or field of the invention** – This addresses the area of application of the technology/invention under which the patent falls. Typically, this is presented in two sentences; the first sentence paraphrases the major field or class of the invention, and the next works as a specific or subclass of the invention in brief.

d. **The background and summary of the invention** – The first section needs to be ***thorough*** as it is to review existing related prior art/inventions not just discussing your invention, this should discuss the related prior art to the invention and contrast the present invention to the existing ones to show the gaps and the technical relevance of the present invention while the second section, summary of the invention needs to be thorough too to clearly states the objectives/advantages of the present invention as explained in attached documents (item I and IV in paragraph 3) as a guide.

e. **The use of diagrams** – Generally, pictures are not appropriate in patent document. Your diagrams should have a brief description (like captions) listed after the summary of the invention while other explanation on each of the diagrams could form part of the detailed description of the invention as it is expected that you explain/describe how each embodiment relates to each other as provided in 3(IV); There should be a ***clearly seen*** schematic drawings (diagrams) or flowcharts and should be properly labelled (i.e., Fig. 1, Fig. 2) in relation to Brief Description of the Drawings.

f. **The detailed description of the invention** – This was not provided in the submitted document. The Detailed Description of the Invention in a patent

specification is **a full technical disclosure** meant to further inform the patent examiner or the public on how the invention works or how it was derived in a systematic and comprehensive manner away from already existing inventions/innovations (prior art); Kindly ensure that this section is elaborated to **at least 5 pages**.

(iv) **The claim(s)**: The claim defines scope of the protection sought in a patent document therefore, the claim(s) of the invention should be properly drafted; the claim(s) should be properly captured in a manner that every inventiveness or core component/embodiment mentioned in the patent specification (*Detailed Description of the Invention)* are systematically covered in the claim(s) of the invention. Issues relating to the submitted document:

a) there are 14 claims in the submitted document which are not adequately drafted and are not supported by the disclosure of the invention;
b) the claims should to be well developed and structure based on the full disclosure of invention,
c) furthermore, the claim(s) are expected to be on **separate pages** after the detailed description of the invention. Please state the claims clearly on separate pages.

3. In view of the issues raised above, it is recommended that close attention be given to the explanations above vis-à-vis the documents listed below to assist you in completing the patent application form and the re-drafting of the patent specification. The following documents are enclosed;

I. a brief guide on patent specification and submission checklist;
II. a new set of patent application forms;
III. sample of completed patent application form; and
IV. copies of international patent specifications.

4. For further assistance, you may wish to forward the softcopy of your patent specification to us at notappidc@notap.gov.ng.

5. Please accept the assurances of the Director General's esteemed regards.

C.M. Anie-Osuagwu (Mrs)
Director, Technology Acquisition and Research Coordination (TARC), Department
for: Director General/CEO

A BRIEF GUIDE ON DRAFTING OF PATENT SPECIFICATIONS (DOCUMENT)

ent:

submission must be arranged as follows:

- ***Title of the invention*** (the title should be descriptive of the invention)
- ***Name of the Inventor(s)***
- ***Abstract*** (one paragraph writing between 50 to 150 words)
- ***Description of the invention***
  - ***Technical field:*** This addresses the area of application of the technology/invention under which the patent falls
  - ***Background of the Invention*** – The inventor must show/give proof of his/her knowledgeability in the technological advancement in the area of said invention by being able to clearly describe recent works carried out in the field of said invention, highlighting their properties, functionalities where applicable, the short comings (gaps as well as imperfections on the existing works) that needed to be addressed and of which is being addressed. **(WHY AND WHAT THE INVENTION IS?)**
  - **Summary of the Invention**: The purpose and objectives of the invention should be explained. All the improvements, inputs, findings, breakthroughs, achievements etc., as against existing works should be highlighted. Also, the uniqueness, the advantages as well as the industrial applicability/use of the invention should be emphasized. **(HOW TO DO THE INVENTION AND APPLICATION OF CAUTIONS WHERE NECESSARY?)**
  - **Brief Description of the Drawings:** or flowcharts (NOT PICTURES) as they relate to each other, (where applicable). Kindly list and state the caption of each of the diagrams or flowcharts here. Also, note that the diagrams could be anywhere in the document.
  - ***Detailed Description*** of all the components as they relate/interact to form unit(s) and finally, a cohesive system while highlighting and pointing out clearly new inputs, findings discoveries and breakthroughs made. This must be in sequential order. However, all the components of the unit(s) or system must be presented in diagrams which are numbered and the numbers are used to explain/reference the individual components of the invention (embodiment), and if it is a process invention that led to product(s) there must be flow charts, graphs and tables where necessary so as to properly explain the new scientific findings in the invention.
- ***Claims***: One will first ask this question: What is the invention to be protected on the claimed embodiment(s), process, product(s), etc., seeking for patent rights? Hence, an appropriate answer to this question is very important in helping to articulate/understand that which an inventor has invented actually. **Also, note that the claims should be written on a new separate page in the patent specification/document**.

Furthermore, the identified invention on embodiment(s), process, product(s), e.t.c., is the principal, broad and major claim upon which other important processes, actions, activities that led to the invention becomes subordinate claims. The claims should be drawn from (a) to (d): results, findings, improvements etc.

Checklist on Submitted Document tick [√] if correct

(i) Is patent specification in three copies? ☐
(i) Is the Application Forms completely typed: one original with two other photocopies? ☐
(ii) Is the arrangement in order? ☐
(iii) Is the patent specification typed in point 14 font size and in a single column? ☐
(iv) Is there an email address and phone contact in your covering letter? ☐

Send your Patent Applications with ***a cover letter*** seeking for **Patent Assistance** through **the Office of Director General,** National Office for Technology Acquisition and Promotion (NOTAP), 4, Blantyre Street, Wuse II, PMB 5074, Wuse, Abuja – FCT, Nigeria

Patents Form - No. 1A

FEE: N.....

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PATENT AND DESIGNS DECREE

No. 60 OF 1970

APPLICATION FOR PATENT

To be accompanied by two copies of complete Patents Specification, Requisite Fee for 3

NOTE:- This is a comprehensive form and parts inappropriate to a particular application should be cancelled. In the case of an application by the investor(s), only sections 1, 4 and 6 of this form appropriate.

1. I/we(1) AMINA SULEIMAN RAJAH AND BAYERO UNIVERSITY, KANO.
PMB 3011, GWARZO ROAD, KANO, KANO STATE.

am/are in possession of an invention which is described in the accompanying(2) provisional specification under the title (3) REUSABLE MENSTRUAL PAD WITH ENHANCED ABSORBENCY AND COMFORT

[I

(4) [We AMINA SULEIMAN RAJAH AND BAYERO UNIVERSITY, KANO.

[The said (4).....

Claim to be the true inventor of the invention

AMINA SULEIMAN RAJAH AND BAYERO UNIVERSITY, KANO.

2. I/We believe (4).....

to be the true inventor of the invention and

[I

(5) [We

[the said..... NATIONAL OFFICE FOR TECHNOLOGY ACQUISITION AND PROMOTION (NOTAP)

[am [assignee of the said inventor in respect of the right to make this

(3) [are (2) [application

[Is ✓ [personal representative of the said inventor

3. The invention or a part of the invention was communicated to

[Me

(5) [us

[the said NATIONAL OFFICE FOR TECHNOLOGY ACQUISITION AND PROMOTION (NOTAP)

By (6) AMINA SULEIMAN RAJAH AND BAYERO UNIVERSITY, KANO

4. And I/We request that the patent may be granted as a patent of addition to (7) patent No.....the patent to be granted on application No.....

5. And I/We request that all notices, requisitions and communications relating to this application may be sent to...NOTAP, No.4, Blantyre Street, Wuse II, Abuja-FCT

Who are hereby appointed to act for me/us.

IBRAHIM AHMAD RUFAI

(7).....

(Declaration to be signed by anyone named as Inventor who is not applicant)

I/We assent to the making of this application; and I/we further assent to the making of any application which may be divided out of this application; and I/We also acknowledge that the applicant is/are my/our signee in respect of the invention

IBRAHIM AHAMD RUFAI

To the Registrar of patents and Designs,
Patents Branch,
Federal Ministry of Commerce & Industry
Abuja

1. Insert (in full) name, address and nationality of applicant(s)
2. Delete the words which are not applicable.
3. Insert title of invention.
4. Insert name of Inventor if included at 1.
5. Insert (in full) name, address and nationality of inventor(s) if not included at 1.
6. Insert (in full) name, address and nationality of communicator.

Patens Form No. 3

FEE: N.....

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Applicants or Agents Ref.

PATENTS Decree No. 60 of 1970

COMPLETE SPECIFICATION

(To be furnished in duplicate - one without fee)

Where Foreign Priority is desired in respect of one or more specification, quote No. or Nos. and date or dates.

No. .....

Date .....

(a) Insert titles of In-Vention.

(a) REUSABLE MENSTRUAL PAD WITH ENHANCED ABSORBENCY AND COMFORT

(b) State (in full) name, address and nationality of applicant or applicants as in application form.

(b) I/We AMINA SULEIMAN RAJAH AND BAYERO UNIVERSITY KANO.

do hereby declare the invention, for which I/we pray that a patent may be granted to me/us, and the method by which it is to be performed, to be particularly described in and by the following statement:

(c) Here begin full description of invention. The continuation of the specification should be upon paper of the same size as this form, on one side only with the lines well spaced and with a margin of one inch and a half on the of the paper. The completion of the description should be followed by the words. "What I (or we) claim is" after which should be written the claim claims numbered consecutively (*see* note below).

The specification and the duplicate thereof must be signed at the end.

(c) SEE ATTACHED PATENT SPECIFICATIONS

NOTE.- The claims must relate to a single invention, must be clear and succinct and must be fairly based on the matter disclosed in the specification. They should define the scope of the invention claimed. Applicants should be careful that their claims include neither more nor less than they desire to protect by their patent. Any unnecessary multiplicity or claims or prolixity of language should be avoided. Claims should not be made for the efficiency or advantages of the invention.

PATENT SPECIFICATION DOCUMENT

REUSABLE MENSTRUAL PAD WITH ENHANCED ABSORBENCY AND COMFORT

Name of the Inventor: AMINA SULEIMAN RAJAH AND BAYERO UNIVERSITY, KANO.

THE ABSTRACT

THE TECHNICAL FIELD

This present invention belongs to the field of feminine hygiene products, specifically reusable menstrual pads designed for enhanced comfort, sustainability, and effectiveness.

BACKGROUND OF THE INVENTION

Menstrual hygiene management remains a critical issue globally, particularly in low-resource settings where access to affordable, effective, and environmentally friendly menstrual products is limited. Conventional disposable menstrual pads, although widely used, pose significant challenges in terms of environmental sustainability, cost, and health concerns. The high plastic content and non-biodegradable nature of these pads contribute substantially to environmental pollution, with millions of used pads accumulating in landfills annually. Additionally, the cost of disposable pads can be prohibitive for many women and girls, leading to menstrual poverty, which adversely impacts their health, education, and overall well-being (UNICEF, 2022).

Several innovations have attempted to address these challenges. The introduction of reusable menstrual pads and menstrual cups has provided sustainable alternatives to disposable options. Menstrual cups offer a long-term reusable solution, but cultural and personal preferences, along with insertion difficulties, limit their widespread adoption in certain regions. Reusable menstrual pads, on the other hand, have gained traction due to their cost-effectiveness and reduced environmental impact. However, many existing reusable pads present design limitations, including inadequate absorbency, discomfort due to bulkiness, and poor fastening mechanisms that lead to shifting during use. These shortcomings often result in leaks and discomfort, discouraging consistent use and limiting their potential as a viable alternative to disposable pads (Pednakar, 2022).

Prior patents and related inventions have attempted to improve menstrual pad designs by incorporating various features, such as enhanced absorbent cores, leak-proof barriers, and secure fastening mechanisms. Some prior innovations introduced moisture-wicking materials to enhance comfort and minimize skin irritation, while others incorporated multi-layered absorption systems to improve

fluid retention. However, despite these advancements, gaps remain in ensuring optimal comfort, absorbency, and leak protection in a single, eco-friendly product. Existing solutions still struggle with factors such as breathability, bulkiness, and ease of maintenance, necessitating further refinement in the design of reusable menstrual pads.

Our invention, the eco-friendly reusable menstrual pad with enhanced absorbency and comfort, addresses these gaps by integrating a tri-partite layering system that significantly improves fluid absorption, ensures dryness, and enhances user comfort. This innovative design overcomes existing shortcomings by optimizing material composition, layering technology, and securing mechanisms to offer a superior menstrual hygiene product.

SUMMARY OF THE INVENTION

This invention relates to an advanced reusable menstrual pad that addresses key concerns of absorbency, comfort, hygiene, and sustainability. The pad is constructed with multiple layers, each serving a distinct function to enhance overall performance. The top layer is designed from moisture-wicking, antibacterial fabric to provide a dry and irritation-free experience. Beneath it, an absorbent core integrates a high-capacity natural fiber blend, ensuring efficient fluid retention while maintaining breathability.

To improve leakage protection, the pad incorporates an impermeable yet breathable backing layer, preventing seepage while allowing airflow to minimize discomfort. The ergonomic design ensures a secure fit, reducing the risk of shifting during movement. Additionally, the pad is designed for easy washing and quick drying, enhancing its practicality for users in various environmental conditions.

This invention advances the field of reusable menstrual hygiene products by addressing existing limitations and offering a more effective, comfortable, and eco-friendly alternative. The combination of innovative material selection and design enhancements ensures an improved user experience while contributing to environmental sustainability.

BRIEF DESCRIPTION OF THE DRAWINGS

Order	Description
1	Figure 1 is a cross-sectional view detailing the tri-layer architecture: Bamboo fleece top layer, Bamboo wadding middle absorbent core, Polyurethane laminate (PUL) bottom layer with non-slip fabric. It also highlights the triangular wings in an unfolded configuration and positioning of the Snap Button.
2	Figure 2 illustrates shows the outline of the absorbent core (contoured shape) measuring 21 cm in length and 10 cm in breadth.

3	Figure 3 is a top view of the soft, breathable bamboo fleece fabric forming the top layer, which ensures comfort and prevents irritation, measuring 29 cm in length and 16 cm in breadth.
4	Figure 4 is bottom view of the waterproof barrier layer made of a breathable yet impermeable Polyurethane Laminate (PUL), which prevents leaks while allowing airflow. It also highlights the non-slip fabric to keep the pad securely in place within the underwear. This layer measures 29 cm in length and 16 cm in breadth.
5	Figure 5 illustrates an exemplary implementation of a reusable menstrual pad as a wearable according to aspects of the present disclosure.
6	Figure 6 is a schematic diagram of the pad secured to an undergarment, demonstrating the triangular wings folded and fastened via snap buttons to prevent displacement.
7	Figure 7 is a flowchart that outlines the systematic steps, from material selection through final assembly, that ensure each component is correctly integrated into the final product.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a reusable menstrual pad that integrates novel material selections and a unique tri-layer architecture to provide enhanced absorbency, comfort, leak protection, and secure fastening. The invention is disclosed in a series of diagrams (FIGS. 1–7) in which each component is assigned a unique reference numeral. The following detailed description explains the invention in sequential order, describing individual components, their interactions, and the overall system architecture. In addition, this description emphasizes new scientific findings and breakthroughs, including the use of bamboo-derived materials and innovative design features that set this invention apart from prior art.

The reusable menstrual pad is designed as a multi-component system in which each layer or element contributes a specific functionality. The system comprises three primary layers (top, middle, and bottom), supported by additional components such as triangular flaps and snap buttons. These elements work synergistically to deliver an effective and environmentally friendly menstrual hygiene solution.

Figure 1 provides a cross-sectional view of the reusable menstrual pad, showcasing the integration of its tri-layer structure. This figure highlights the specific components of the pad that work together to provide comfort, absorbency, and leak protection. The top layer (101) is made of bamboo fleece, a soft, breathable fabric that is hypoallergenic and highly effective in moisture-wicking. This layer sits against the skin and ensures comfort by keeping the

surface dry. Bamboo fleece is an ideal choice because it is both gentle on the skin and durable, providing long-lasting softness with repeated use. Its moisture-wicking properties help to prevent any irritation that might otherwise occur from prolonged skin contact with menstrual fluid. The top layer is designed to be gentle yet functional, maintaining a dry surface and reducing the risk of skin rashes or discomfort.

The middle core (201) is composed of bamboo wadding, a highly absorbent material that forms the heart of the pad. This layer is engineered to efficiently trap and retain menstrual fluid, ensuring that the pad can accommodate different flow levels without leakage. Bamboo wadding is both breathable and highly absorbent, allowing the pad to maintain a comfortable and dry feeling for the user. The core's function is crucial because it prevents menstrual fluid from reaching the outer layers and ensures that the pad maintains its integrity even during heavy flows. The absorbent core is specifically contoured to measure 21 cm in length and 10 cm in breadth, providing ample coverage and absorbency.

The bottom layer (301) is made of Polyurethane Laminate (PUL), a material that is both liquid-impermeable and breathable. This layer ensures that menstrual fluid does not leak out of the pad while allowing airflow to reduce moisture buildup. The breathable quality of PUL helps to maintain comfort by preventing the pad from becoming overly warm or sweaty, which can lead to discomfort. Additionally, PUL is a durable and eco-friendly material, ensuring that the pad can be used repeatedly without degrading in performance. This layer also contributes to the overall sustainability of the product by offering a long lifespan even with multiple washes. The PUL layer, which measures 29 cm by 16 cm, covers the entire bottom surface of the pad, providing full protection against leakage.

The triangular flap (401) is a unique design feature that is integrated into the pad to ensure a secure fit and prevent shifting during use. The flap extends from the sides of the pad and is designed to wrap around the user's underwear. This innovative flap design ensures that the pad stays in place throughout the day, even during movement or physical activity. The triangular shape of the flap not only adds to the pad's overall functionality but also contributes to its aesthetic, providing a sleek and user-friendly appearance. The flap's design enhances the fit and ensures that the pad does not slide or bunch, giving users greater confidence in its reliability.

The snap button (402) is a fastening mechanism that secures the triangular flap in place. This feature ensures that the pad remains securely attached to the underwear, preventing any displacement. The snap button is strategically positioned at the edge of the flap and ensures that, once fastened, the pad stays firmly in place throughout use. The snap button design is practical, easy to use, and allows for quick attachment and removal of the pad, enhancing convenience

for the user. The fastener system is durable, designed to withstand repeated use and washing without losing its effectiveness.

As illustrated in Figure 1, these components—101, 201, 301, 401, and 402—work in concert to create a menstrual pad that is not only functional but also durable. The seamless integration of these layers ensures that the pad can withstand repeated use and washing without compromising its performance. The transitions between the layers are reinforced, which improves the overall durability of the pad. This design is especially important in maintaining the integrity of the pad over time, ensuring that each layer performs optimally without separating or degrading after multiple uses.

The materials chosen for each layer contribute to the overall performance of the pad, enhancing its absorbency, comfort, and leak protection. The tri-layer system ensures that fluid is absorbed quickly by the bamboo fleece, retained securely in the bamboo wadding core, and prevented from leaking by the PUL bottom layer. The unique fastening system, consisting of the triangular flap and snap button, keeps the pad securely in place, preventing shifting and ensuring that the pad stays comfortable throughout wear.

Figure 2 illustrates the absorbent core of the reusable menstrual pad, which is made from bamboo wadding. This core is the central component responsible for capturing and retaining menstrual fluid, and it is strategically designed to maximize absorption while ensuring comfort and leak prevention. The middle core (201) is made from bamboo wadding, which serves as the absorbent material of the pad. The internal reinforcing structures and segmented zones (206) are a critical innovation in the design of the absorbent core (represented by dotted lines). These features facilitate the even distribution of menstrual fluid throughout the core and maximize the efficiency of the bamboo wadding in holding the fluid. The segmented zones create internal compartments within the core, which help distribute the fluid more evenly across the entire surface area. This prevents the fluid from pooling in one area, which could lead to leaks or discomfort. The reinforcing structures add stability to the core, ensuring that the layers of bamboo wadding remain in place and continue to perform effectively even with repeated use. By incorporating these design elements, the core ensures that the bamboo wadding's absorbency is fully utilized, providing efficient fluid retention and minimizing the chances of leakage. This innovative design allows the pad to perform well across various flow levels, from light to heavy, by adjusting the fluid distribution throughout the core.

The curved oval shape of the core (202) is specifically chosen to ensure that the pad fits the body naturally and comfortably. The contour of the core follows the anatomical shape of the wearer's body, providing a more secure and comfortable fit. The shape helps prevent the pad from bunching up or shifting during use, which could lead to discomfort or leaks. This shape also contributes to the pad's

overall ergonomic design, making it easier for the user to wear the pad discreetly and comfortably.

The primary boundary of the core (203) outlines the edge of the absorbent material, which defines the limits of the bamboo wadding's coverage area. This boundary ensures that the core fits precisely within the pad and does not extend beyond the area designated for fluid absorption. This precise demarcation of the core's boundary ensures that the pad's absorbent properties are maximized, and it provides a stable structure that contributes to the pad's durability. The boundary of the core also plays a role in preventing fluid from escaping beyond the designated absorbent area. By ensuring that the core is contained within the correct dimensions, the pad functions more efficiently, providing better protection against leaks.

The breath (204), marked as 10 cm, refers to the width of the core in its expanded form. The 10 cm width ensures that the pad provides sufficient coverage and absorbency, allowing it to capture and hold menstrual fluid effectively. The width is designed to match the optimal balance between absorbency and comfort. The 10 cm width allows the bamboo wadding to efficiently capture fluid while maintaining a slim profile that fits comfortably within the user's undergarment. The length (205), marked as 21 cm, refers to the overall length of the absorbent core. This length is carefully chosen to provide ample coverage and absorption capacity for users with various flow levels. The 21 cm length ensures that the pad provides full protection during use, accommodating the average length of most menstrual flow areas.

Figure 3 provides a top view of the reusable menstrual pad, specifically highlighting the top layer, which is made of soft, breathable bamboo fleece fabric. This layer is crucial for ensuring comfort and preventing irritation while wearing the pad. The dimensions and features of the pad's top layer are marked with specific numbers, and each component plays an important role in the pad's functionality and user experience.

The length (106) of the top layer is 29 cm. This dimension is designed to ensure that the pad provides adequate coverage for the user. The 29 cm length provides sufficient surface area for fluid absorption and retention. The length also contributes to the overall comfort of the pad by allowing it to cover the necessary areas of the undergarment, preventing any leaks or discomfort during use. The breadth (107) of the top layer is 16 cm, which provides the optimal width for the pad. This width ensures that the pad fits comfortably within the user's undergarment, covering the necessary area while maintaining a slim profile.

The stitched seam (108) is a critical feature in the design of the pad, as it joins the edges of the top layer (101 - bamboo fleece) and the bottom layer (301 - PUL). The stitched seam runs along the perimeter of the pad and ensures that the

different layers of the pad stay securely in place, preventing fluid from seeping between the layers. The stitching is essential for the pad's durability and functionality, as it reinforces the bond between the layers, ensuring that the top, absorbent, and waterproof layers remain intact over time. This seam is designed to hold the layers together tightly, preventing any gaps or openings that could lead to leakage. The precise stitching helps maintain the integrity of the pad, even after repeated washing and use.

Although not shown in this diagram in full detail, 401 and 402 represent the fastening mechanism that secures the pad in place, ensuring it remains comfortably and reliably attached to the user's undergarment. The triangular wings (401) are designed to wrap around the sides of the undergarment, while the snap buttons (402) ensure that the wings stay securely fastened during use. This fastening system prevents the pad from shifting or bunching, which could cause discomfort or leakage.

Figure 4 illustrates the bottom layer of the reusable menstrual pad, which plays a crucial role in preventing leakage and ensuring the pad stays securely in place during use. The bottom layer is made from Polyurethane Laminate (PUL), a material that is both liquid-impermeable and breathable. This layer serves as a waterproof barrier while allowing airflow, ensuring comfort and hygiene.

The length (302) of the bottom layer is 29 cm, which matches the length of the top layer. This ensures that the pad offers full coverage from front to back, providing a reliable barrier against leaks during use. The 29 cm length is designed to fit most undergarments, ensuring that the pad stays securely in place, preventing movement that could result in leakage. The length is an essential dimension for the pad's performance, as it ensures that the pad offers ample surface area for fluid absorption and protection, while also maintaining a discreet and comfortable fit under clothing. The breadth (303) of the bottom layer is 16 cm, which matches the breadth of the top layer as well. This provides uniformity in design, ensuring that the pad fits properly within the undergarment. This measurement is designed to optimize both comfort and functionality. The non-bulky design ensures the pad remains discreet while offering maximum protection.

The non-slip fabric (304) integrated into the bottom layer is a significant innovation that enhances the pad's stability during use. This non-slip fabric is crucial for keeping the pad in place, preventing it from shifting or bunching within the undergarment. The fabric's texture ensures that the pad remains firmly attached to the user's underwear, even during movement or physical activity. This is especially important for users who lead active lives or need a pad that will stay securely in place throughout the day.

The integration of non-slip fabric into the bottom layer marks a key improvement over prior art, as it not only prevents leaks by keeping the pad properly aligned with the body but also ensures that the pad stays in its intended position. Unlike traditional pads that may shift or bunch, causing discomfort or leakage, this feature provides a more secure and reliable solution. The non-slip fabric allows the user to move freely without worrying about the pad shifting, which significantly enhances the overall user experience.

Figure 5 provides an illustration of an exemplary implementation of a reusable menstrual pad as a wearable, specifically showcasing how the pad can be configured to fit the body of the user using a strapping mechanism. The figure highlights several important components that make the pad easy to wear, secure, and functional. 510a and 510b refer to the strapping mechanism that is used to secure the reusable menstrual pad to the body of the user. This system is an innovative addition to the design, enabling the pad to be worn similarly to a pair of underwear, offering greater convenience and security during use. 510a is the front waist part, which is bonded with a wide elastic belt that wraps around the waist of the user. 510b is the back waist part, which is similarly bonded with a wide elastic belt.

Figure 5 illustrates how the menstrual pad functions when worn, specifically in conjunction with a strapping mechanism (510a and 510b) and how it fits around the user's body. The pad's design includes elastic belts bonded to both the front and back waist parts of the exterior layer, which secure the pad in place.

Figure 6 provides a schematic diagram that demonstrates how the reusable menstrual pad is secured to an undergarment using snap buttons and triangular wings. This configuration ensures the pad remains in place during use, preventing displacement, shifting, or bunching, which could otherwise lead to discomfort or leakage. The snap button (402) is the primary fastening mechanism that secures the triangular wings of the pad to the user's underwear. This fastening system (403) is crucial for ensuring that the pad stays securely in place throughout wear, even during movement or physical activity. The snap button is strategically placed at the edges of the triangular wings of the pad. When the wings are folded around the sides of the underwear, the snap button is engaged to hold the wings in place. This prevents the pad from shifting or becoming misaligned, ensuring that it stays securely attached to the underwear during use.

The triangular wings (401) are an integral part of the design, serving to wrap around the sides of the underwear and provide additional stability. The design of the wings ensures that the pad fits snugly and comfortably against the body, reducing the risk of displacement during wear. By using snap buttons as the fastening mechanism, the pad benefits from a secure and durable solution that can withstand repeated use and washing. The snap button system allows for easy

attachment and removal of the pad, offering convenience for the user while ensuring a reliable fit. When the menstrual pad is placed inside the underwear, the triangular wings (401) are positioned around the sides of the underwear, wrapping it securely to the crotch area. Once the wings are folded, the snap buttons (402) are engaged, fastening the wings securely to the underwear. The snap button ensures that the pad stays in place and does not shift during normal movement or physical activity. With the snap buttons engaged, the pad remains securely attached to the underwear, preventing any discomfort or shifting. This fastening method is both effective and easy to use, ensuring the pad stays in place without requiring complex fasteners or adjustments.

Figure 7 outlines the step-by-step process of manufacturing the reusable menstrual pad, starting with material selection. The materials chosen for each component are crucial for ensuring comfort, absorbency, and durability. The top layer, made from bamboo fleece (101), is selected for its softness and moisture-wicking properties. The middle core (201) is made of bamboo wadding, known for its high absorbency, while the bottom layer (301) is constructed from Polyurethane Laminate (PUL), which is both liquid-impermeable and breathable, with an integrated non-slip fabric to ensure the pad stays in place.

The second step in the flowchart involves layer preparation and cutting. The top and bottom layers (106, 107) are cut to 29 cm × 16 cm, while the core layer (201) is cut to 21 cm × 10 cm. These dimensions are essential for providing optimal coverage, fit, and absorbency. The proper cutting of each layer ensures that the pad is assembled correctly, with the top layer fitting securely over the core and the bottom layer providing the necessary leak protection.

In the assembly of layers, the top layer (101) is aligned over the absorbent core (201), and the bottom layer (301) is attached, ensuring a seamless overlap. This step is vital in ensuring that the pad performs effectively, keeping menstrual fluid contained while maintaining breathability. The snap button mechanism (402, 403) is integrated into the triangular wings (401), securing the pad onto the user's underwear. This fastening system ensures the pad stays in place during wear, preventing any shifting or discomfort.

Finally, the final quality check is conducted to ensure the pad meets all required standards. After the quality check, the pad is packaged, ready for distribution as a cohesive, ready-to-use pad. Each component, from material selection through assembly to fastening mechanism integration, plays an important role in ensuring the final product meets user expectations for comfort, reliability, and sustainability. The step-by-step process ensures that every component is integrated correctly, making the reusable menstrual pad a high-quality product.

What is claimed is:

CLAIM 1:

A reusable menstrual pad comprising:

a) a top layer made of a hypoallergenic bamboo fleece material, wherein the top layer is designed for rapid fluid absorption and moisture-wicking to maintain surface dryness;

b) a middle absorbent core made of bamboo wadding, wherein the middle layer is engineered to efficiently retain menstrual fluid, prevent leakage, and ensure breathability;

c) a bottom layer made of a liquid-impermeable yet breathable Polyurethane Laminate (PUL), wherein the bottom layer is designed to prevent fluid leakage while allowing airflow to maintain comfort and prevent moisture build up;

d) triangular wings extending from the sides of the pad, wherein the wings are designed to wrap around an undergarment and include a fastening mechanism;

e) a snap button fastening mechanism located at the edge of the triangular wings, wherein the snap button is configured to secure the pad in place to prevent shifting and ensure a snug fit during use.

CLAIM 2:

The reusable menstrual pad of claim 1, wherein the top layer (a) is made from a breathable and antibacterial fabric to ensure user comfort and prevent skin irritation.

CLAIM 3:

The reusable menstrual pad of claim 1, wherein the middle absorbent core (b) is contoured to fit the anatomical shape of the user, providing a more comfortable and secure fit.

CLAIM 4:

The reusable menstrual pad of claim 1, wherein the bottom layer (c) includes a non-slip fabric integrated into the Polyurethane Laminate (PUL) layer, designed to prevent the pad from shifting or bunching during movement or physical activity.

CLAIM 5:

The reusable menstrual pad of claim 1, wherein the dimensions of the pad are 29 cm in length and 16 cm in breadth, ensuring adequate coverage and a snug fit in standard undergarments.

CLAIM 6:

The reusable menstrual pad of claim 1, wherein the middle absorbent core (b) is 21 cm in length and 10 cm in breadth, optimized for fluid retention and preventing leakage.

CLAIM 7:

The reusable menstrual pad of claim 1, wherein the fastening mechanism (d) is designed for easy attachment and removal, providing a durable solution that withstands repeated use and washing without losing its effectiveness.

CLAIM 8:

The reusable menstrual pad of claim 1, wherein the top layer (a) is made from bamboo fleece fabric that is both gentle on the skin and highly durable, offering long-lasting comfort after repeated washing.

CLAIM 9:

The reusable menstrual pad of claim 1, wherein the pad is designed for repeated washing and reuse without degradation of absorbency, ensuring longevity and sustainability of the product.

CLAIM 10:

A method of manufacturing the reusable menstrual pad of claim 1, comprising the steps of:

a) selecting a hypoallergenic bamboo fleece for the top layer, bamboo wadding for the middle absorbent core, and Polyurethane Laminate (PUL) with non-slip fabric for the bottom layer;

b) cutting the top layer to dimensions of 29 cm by 16 cm, the absorbent core to dimensions of 21 cm by 10 cm, and the bottom layer to dimensions of 29 cm by 16 cm;

c) assembling the layers in a multi-component system, ensuring each layer is properly aligned to provide optimal absorbency, comfort, and leak protection;

d) integrating the triangular wings with snap button fastening mechanisms to secure the pad in place when worn;

e) performing a final quality check to ensure all components meet user expectations for comfort, reliability, and sustainability.

CLAIM 11:

The reusable menstrual pad of claim 1, wherein the absorbent middle layer includes segmented zones with internal reinforcing structures configured to evenly distribute menstrual fluid across the layer.

CLAIM 12:

The reusable menstrual pad of claim 1, wherein the fastener is a snap button affixed to each triangular wing.

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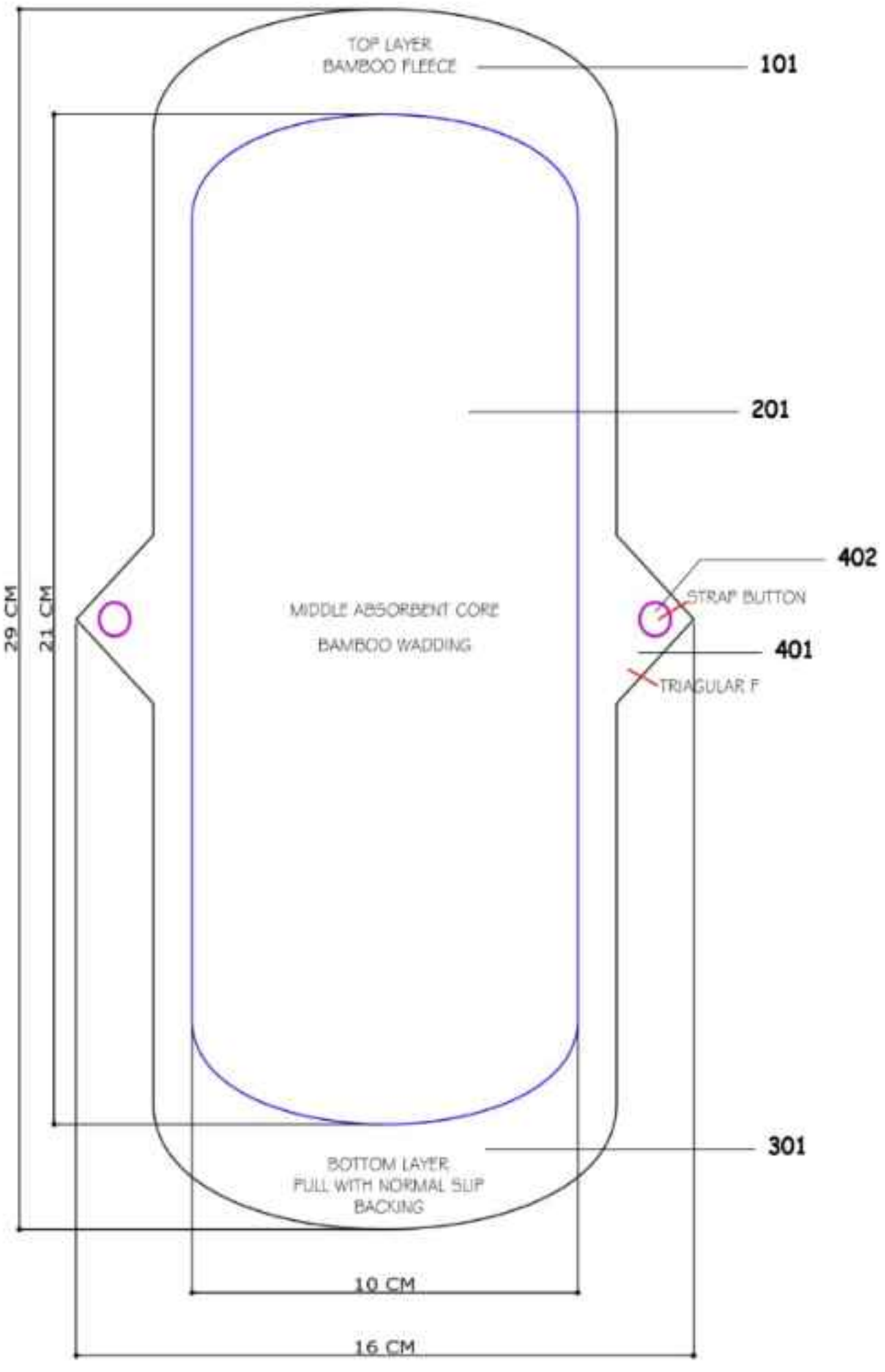

REUSABLE MENSTRUAL PAD

FIGURE 1

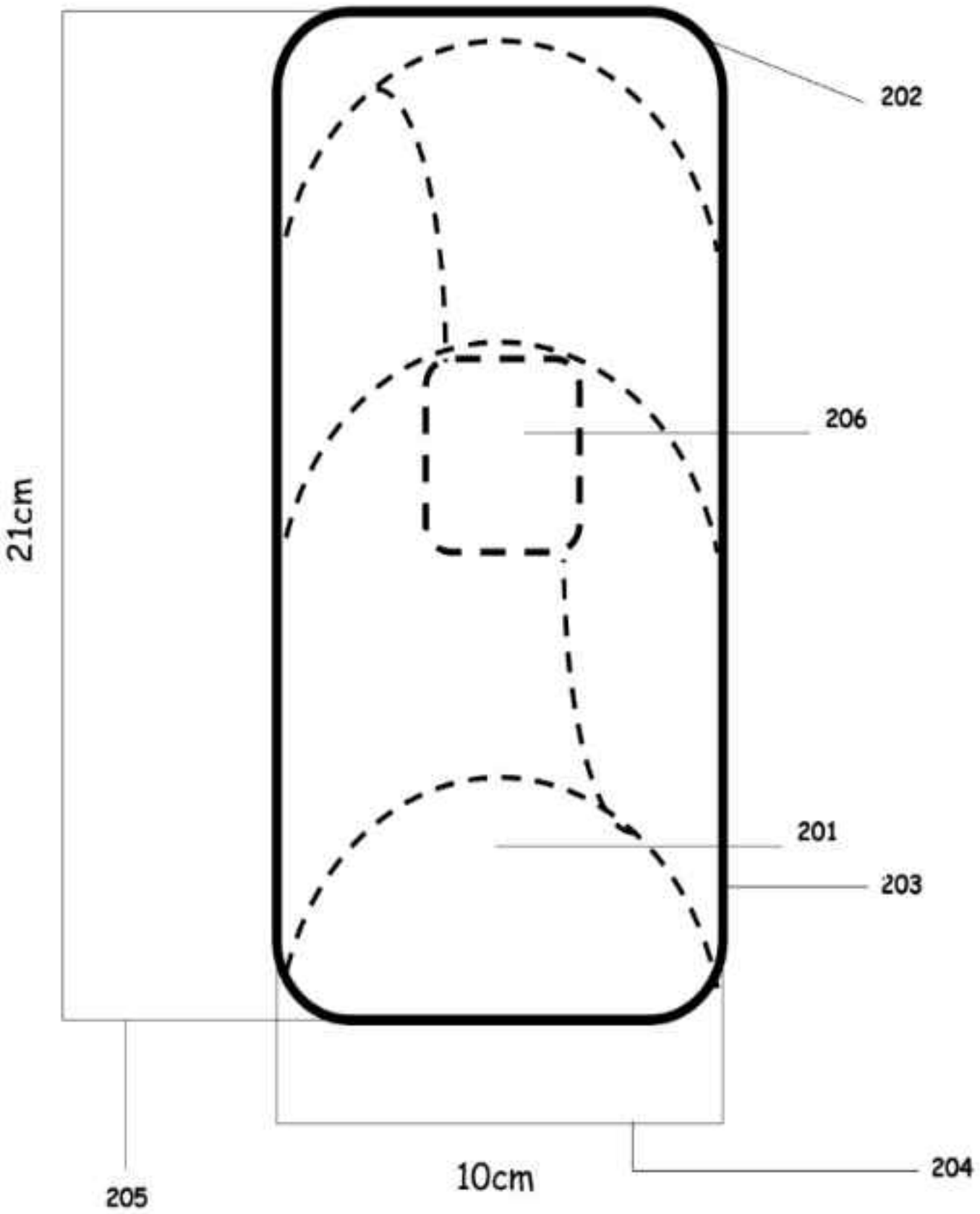

FIGURE 2

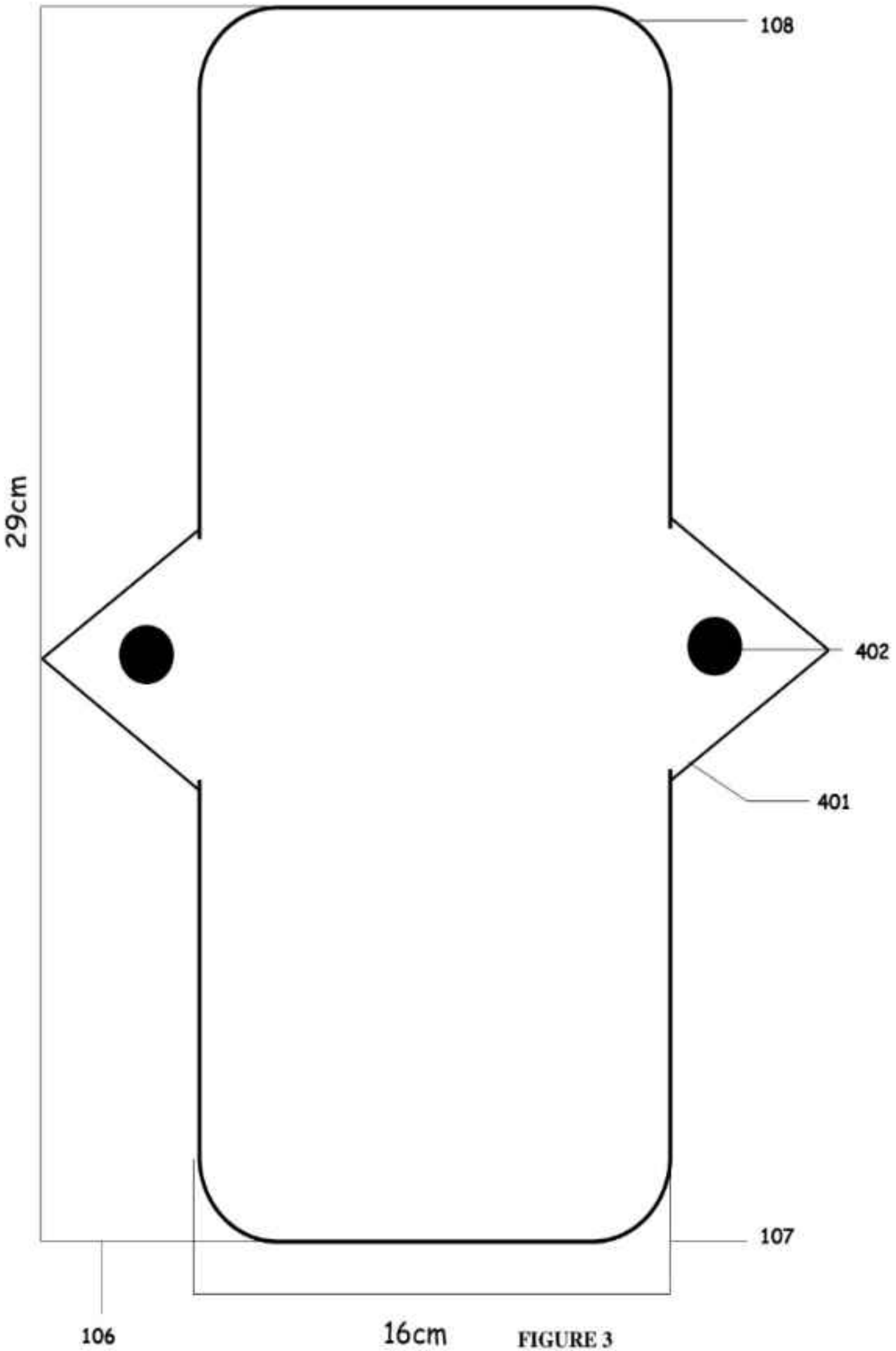

FIGURE 3

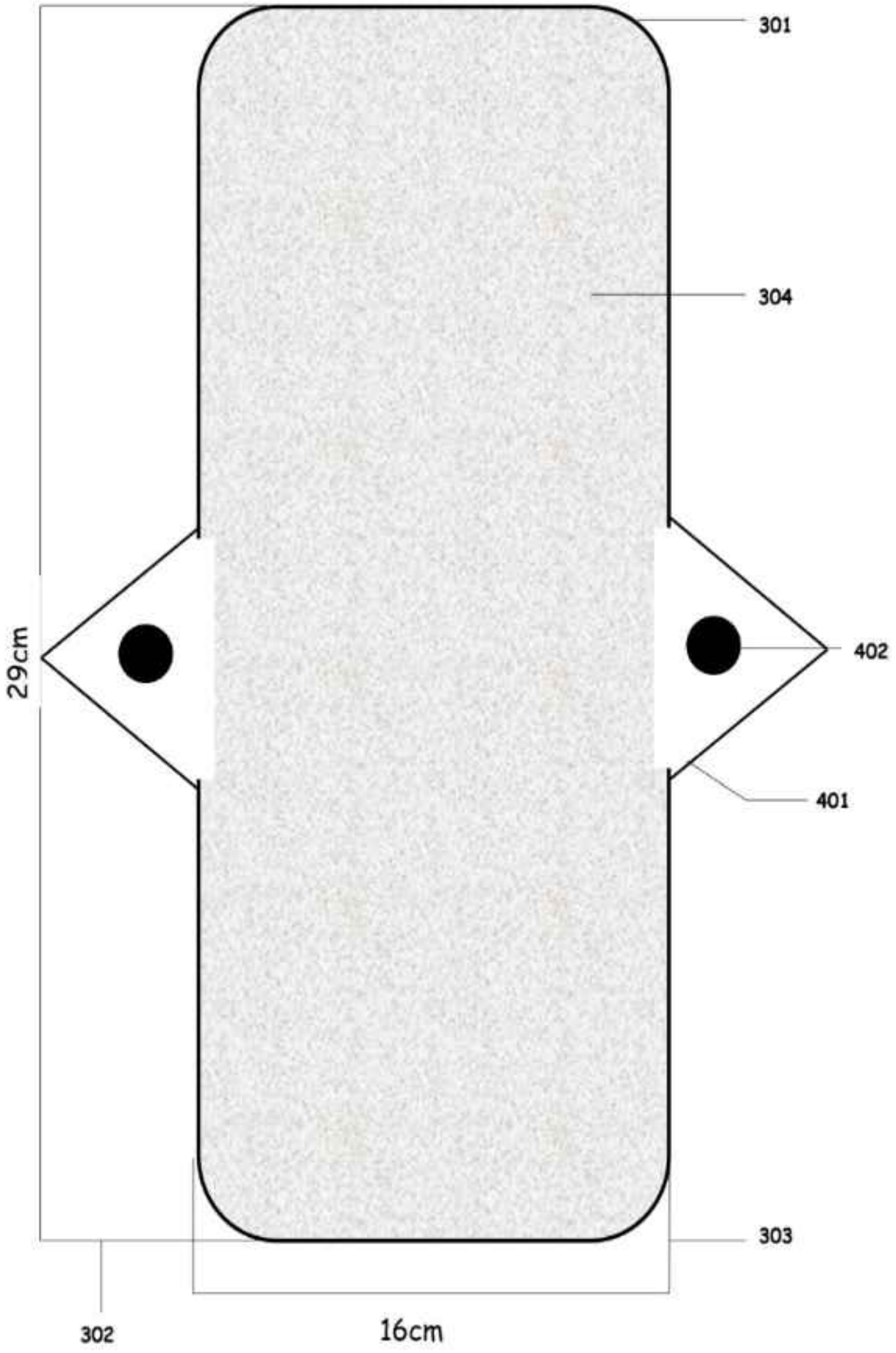

FIGURE 4

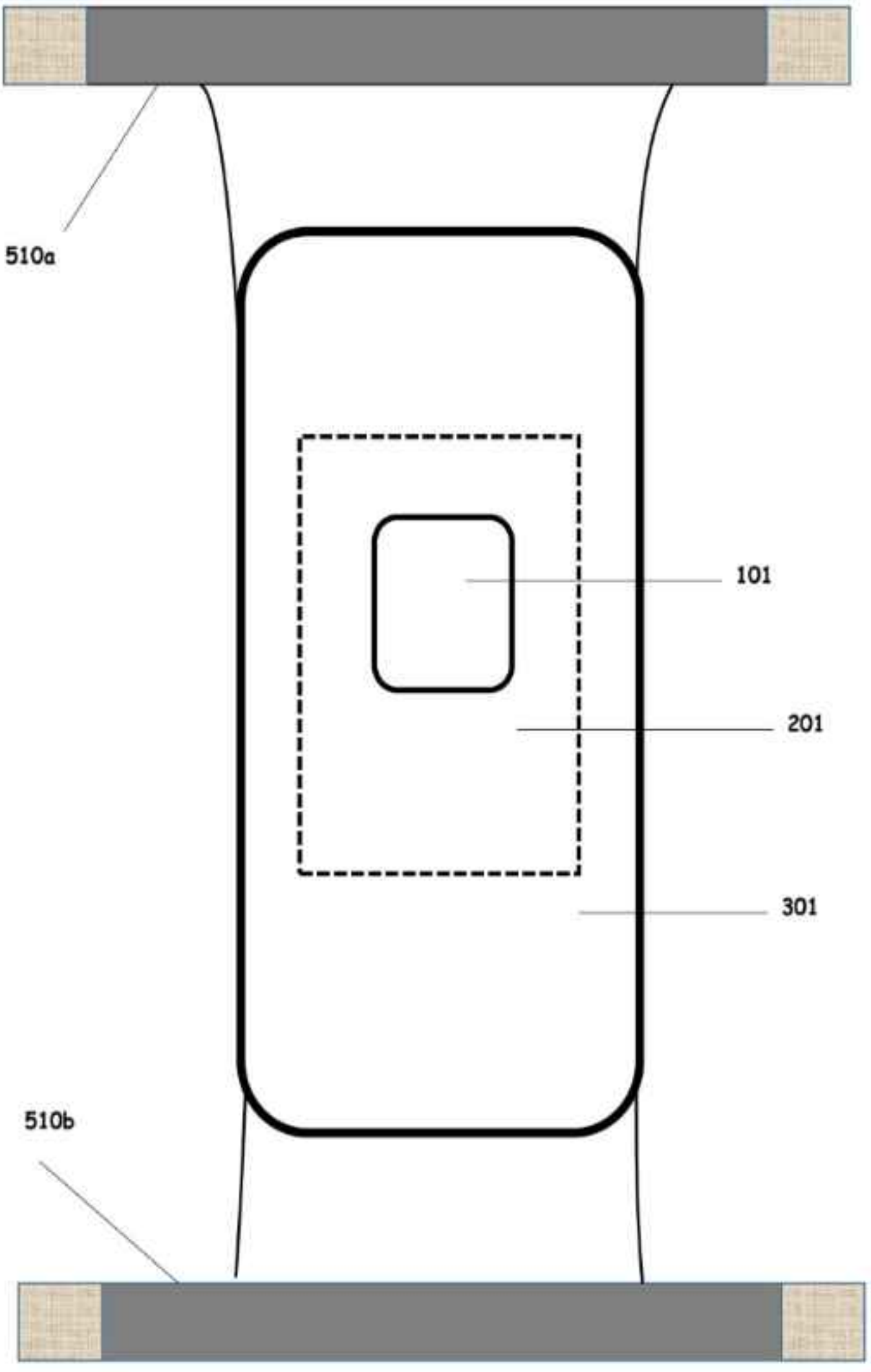

FIGURE 5

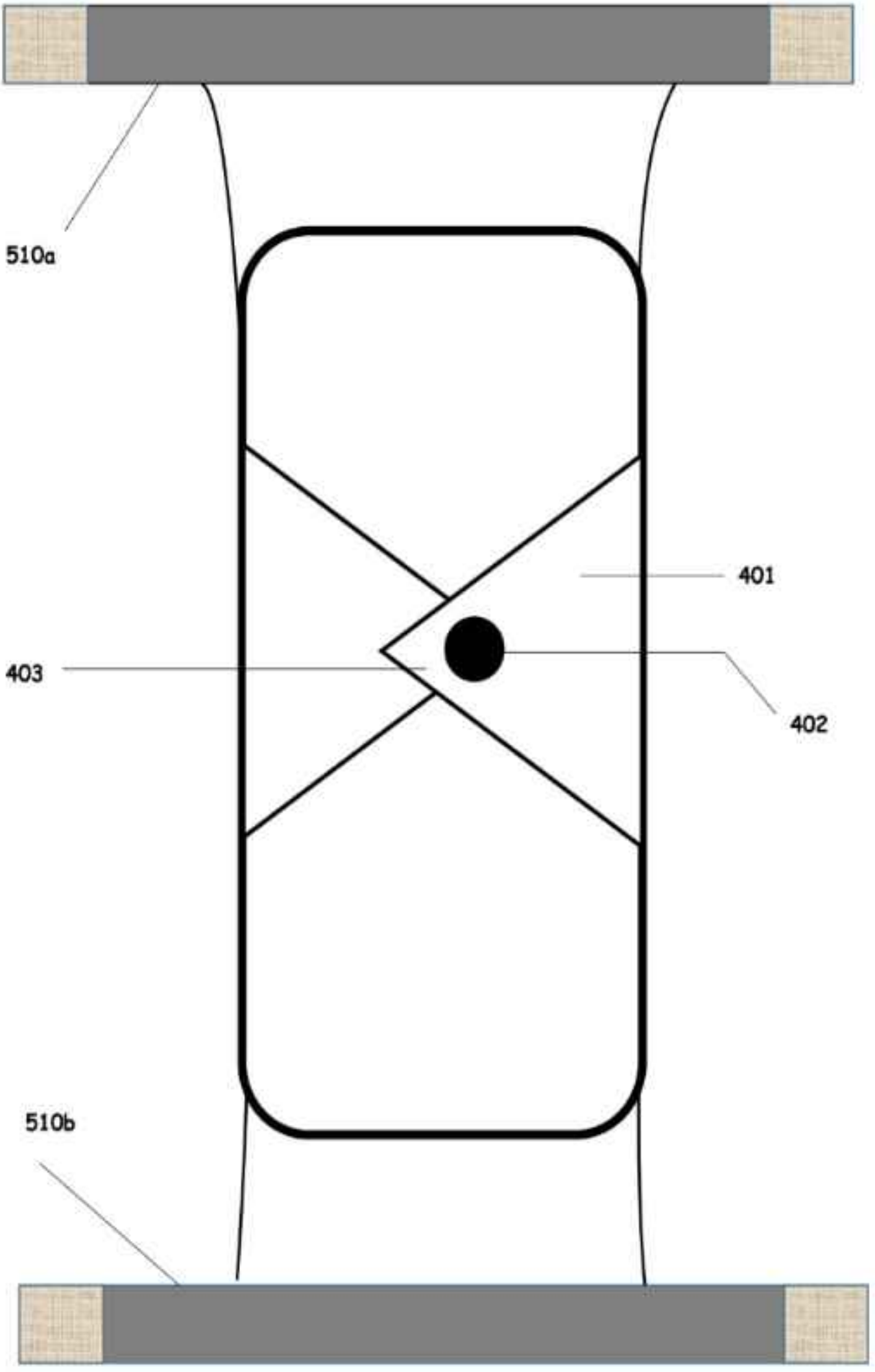

FIGURE 6

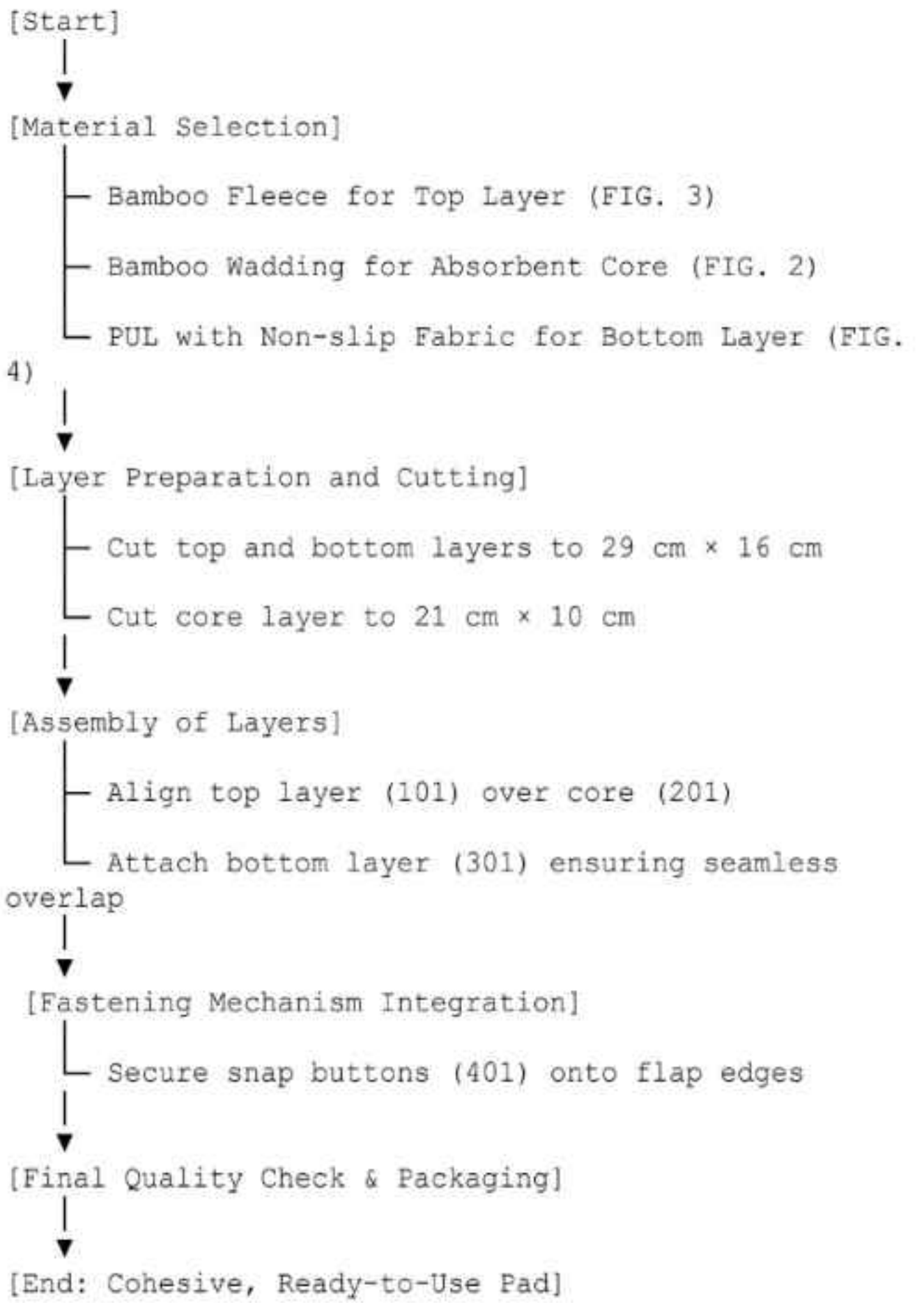
[Start]
[Material Selection]
Bamboo Fleece for Top Layer (FIG. 3)
Bamboo Wadding for Absorbent Core (FIG. 2)
PUL with Non-slip Fabric for Bottom Layer (FIG. 4)
[Layer Preparation and Cutting]
Cut top and bottom layers to 29 cm × 16 cm
Cut core layer to 21 cm × 10 cm
[Assembly of Layers]
Align top layer (101) over core (201)
Attach bottom layer (301) ensuring seamless overlap
[Fastening Mechanism Integration]
Secure snap buttons (401) onto flap edges
[Final Quality Check & Packaging]
[End: Cohesive, Ready-to-Use Pad]

FIGURE 7