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(54) **WEARABLE GARMENT WITH INTERCHANGEABLE WETNESS INDICATOR**

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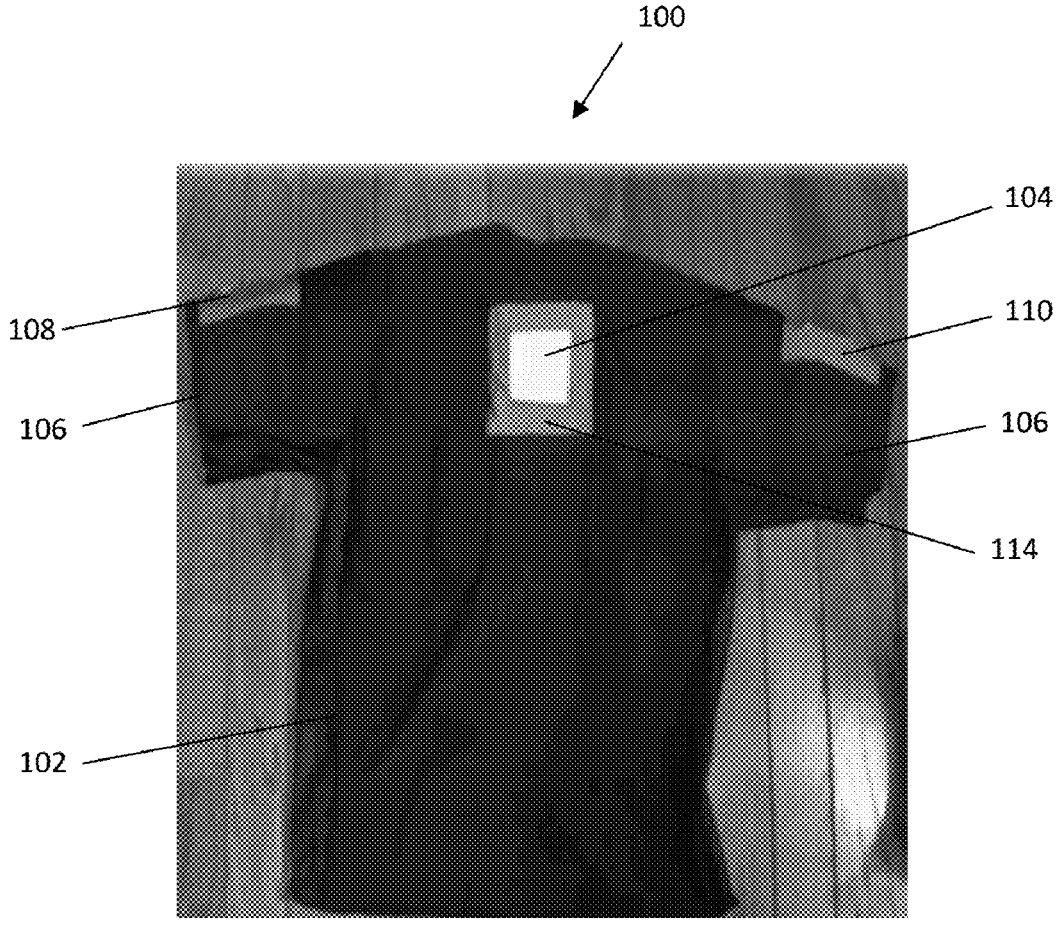
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(57) **ABSTRACT**

Embodiments include a wearable garment for recreational water shooting games. The wearable garment has a first surface, and a first target block removably coupled to the first surface. The first target block has a reticulated porous body and a coating. The coating can be opaque when the first target block is dry. The coating can become transparent to visible light when the first target block is exposed to water, and reveal an indicia underneath the coating. Embodiments also include a method of using the wearable garment for playing recreational water shooting team game between two teams.



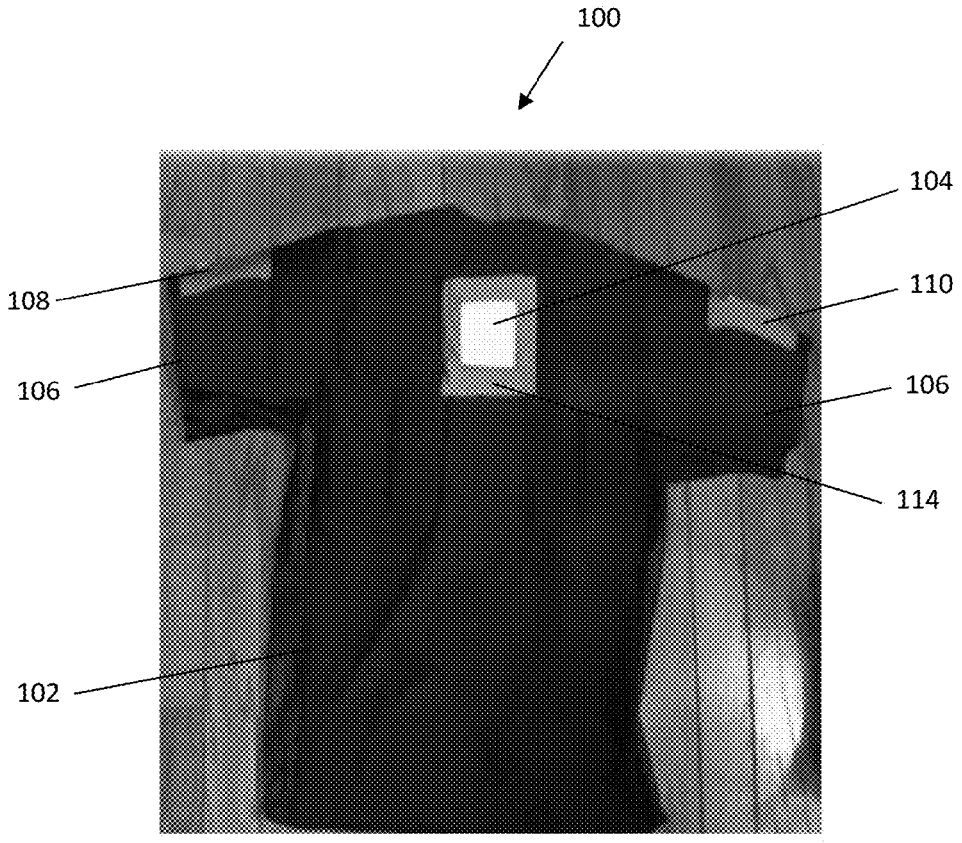


FIGURE 1



FIGURE 2

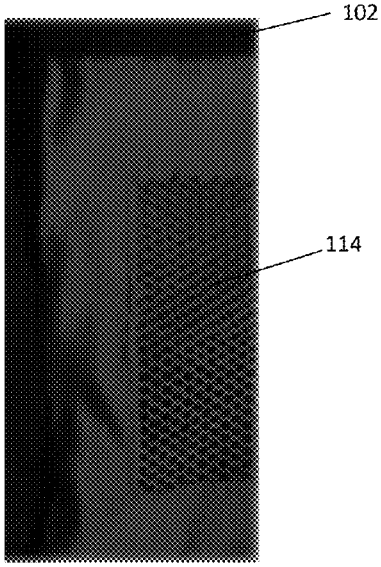


FIGURE 3A

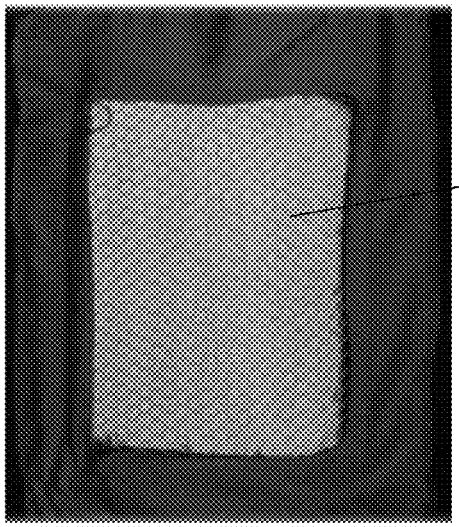


FIGURE 3B

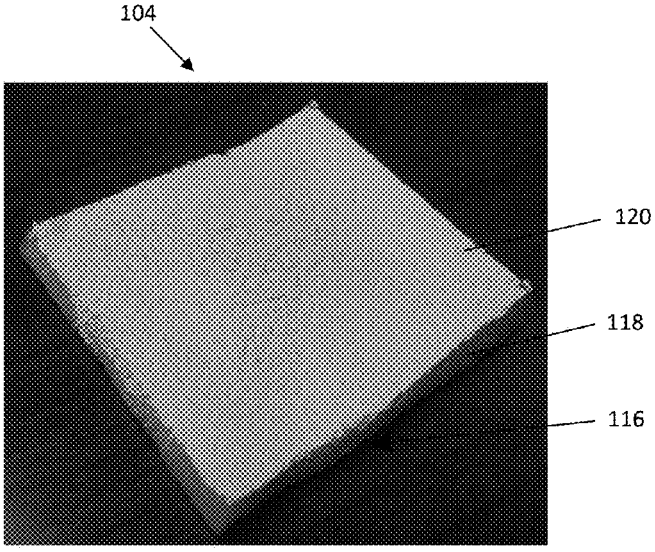


FIGURE 4

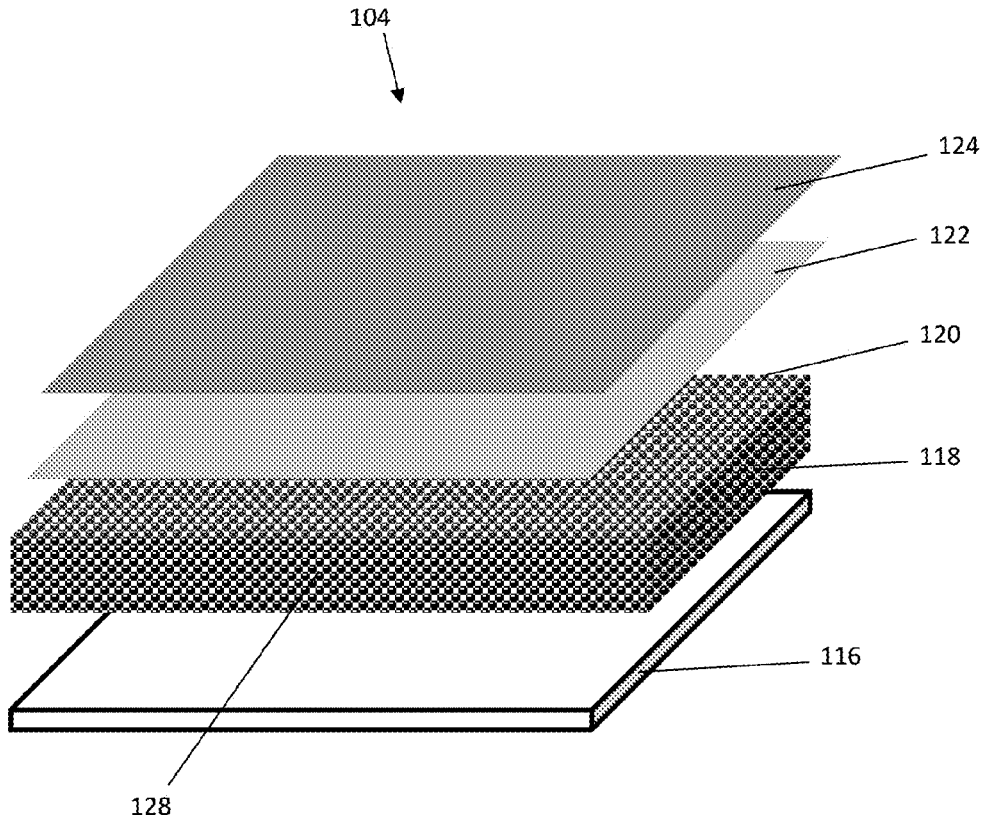


FIGURE 5

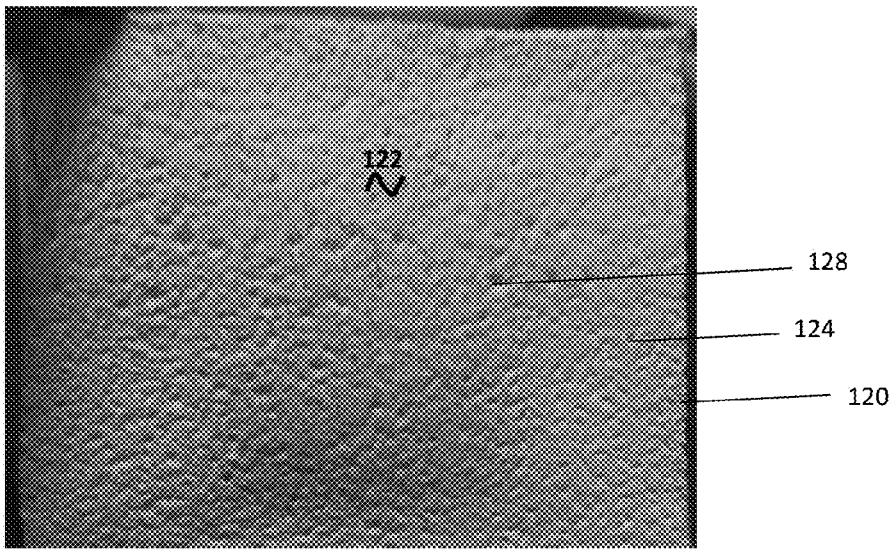


FIGURE 6

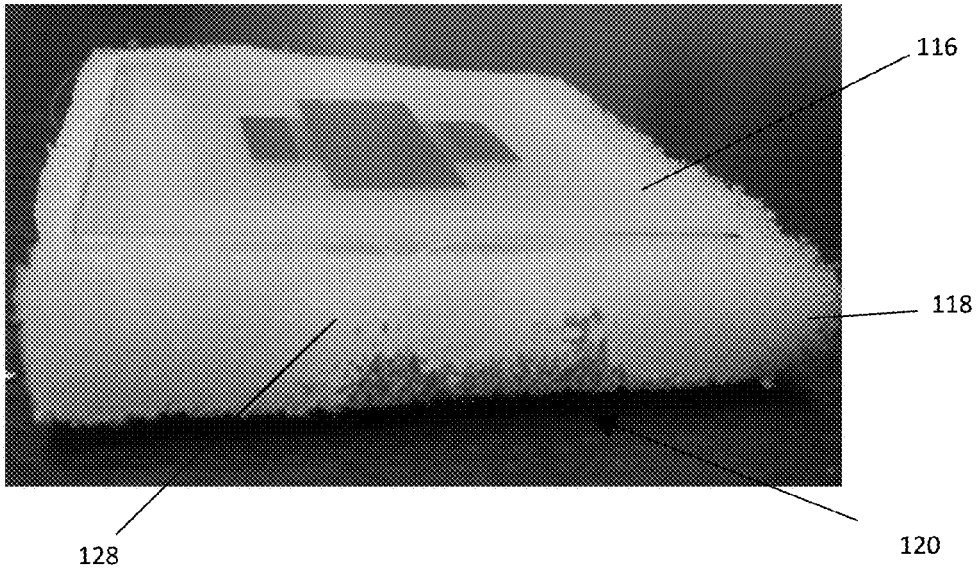


FIGURE 7

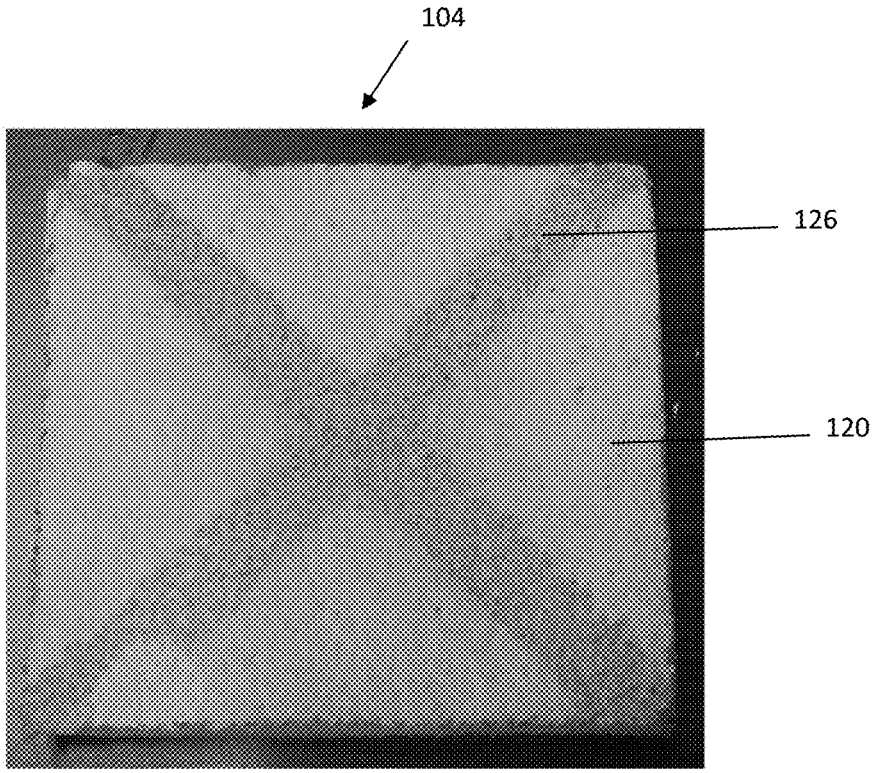


FIGURE 8

WEARABLE GARMENT WITH INTERCHANGEABLE WETNESS INDICATOR

FIELD

[0001] This disclosure generally relates to wearable garments with wetness indicators and more specifically wetness indicators with a water distributing substrate positioned on a replaceable part of the garment.

BACKGROUND

[0002] Recreational target shooting games are generally well known in the art. These games typically involve a shooter aiming a laser-beam or a water gun at a target player. The target player typically wears a garment that changes color or includes other visual indicator when "shot" by the shooter. The garment and the target area may be made of known materials such as cotton, fleece, flannel, polyester, nylon and the like. An exemplary game may involve the target player wearing a garment with a fluorescent target area. When a laser-beam is incident upon the garment, the target area may glow to indicate a "hit". Another example may include a recreational water games (e.g., with water squirt guns) to visually indicate if a player has been hit. In such examples, the target area of the target player's garment may be coated with an indicator ink or paint (e.g., pH-sensitive indicators) which may turn transparent or change colors when wetted with water. One such paint is known as Hydro Chromic White paint, or one such ink is known as Hydro Chromic White ink, which remains opaque when dry and transparent when wet. If, for instance, a coating of such a paint or ink covers a colorful pattern on a dry surface, the pattern may not be visible due to the opaqueness of paint or ink when dry. Exposing the surface to water and/or moisture may reveal the colorful pattern underneath the coating. The colorful pattern can then be used to visually distinguish if a target player has been hit.

[0003] Known wearable garments with wetness indicators have many disadvantages. Garments made of cotton, flannel, fleece, polyester or nylon may allow water to evaporate quickly, typically on the order of 5-10 minutes. In such cases, the paint or ink coating may turn opaque again when the target area is dry, thus preventing the ability to indicate if a target player has been hit. Quick-drying fabrics are thus limited in used for extended game play, or when recreational target shooting is played as a team sport (e.g., with rules similar to soccer). Known garments with wetness indicators also include targets that are permanently attached to the garment, which can limit their ability to be used in a team sport of recreational target shooting. For instance, the target area may just be a part of the garment (e.g., sleeves of a vest). Thus, the target player must wait until the garment is dry and the paint or ink coating is opaque again before being allowed to join the game. Fabrics such as cotton, fleece, flannel, nylon and the like also deform when wet, thus unable to retain their shape, making such fabrics difficult to use and/or replace during the game, thus hindering consistent and uninterrupted game play.

[0004] Improved garments with wetness indicators are needed.

SUMMARY

[0005] Embodiments of the invention include a wearable garment for recreational water shooting games. The wearable garment may include a first surface, and a first target block removably coupled to the first surface. The first target block may include a back surface, a reticulated porous body supported by the back surface, and a front surface. The front surface includes a coating. The coating may remain opaque when the front surface is dry. The coating can become transparent to visible light when the front surface is exposed to water, in order to reveal an indicia underneath the coating.

[0006] Embodiments of the invention can also include a method of using a wearable garment for playing recreational water shooting team game between two teams. Each player in a team aims to shoot a player of an opposite team with a water squirt gun. The method may involve providing each player with a wearable garment such as those described herein. The water shooting team game can be commenced. The method may involve determining if the first target block has been exposed to water from the water squirt gun. The first target block exposed to water may be removed and replaced with a second target block. The second target block may have identical properties as the first target block and can be dry when replaced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The following drawings are illustrative of particular embodiments of the present invention and therefore do not limit the scope of the invention. The drawings are not necessarily to scale (unless so stated) and are intended for use in conjunction with the explanations in the following detailed description. Embodiments of the invention will hereinafter be described in conjunction with the appended drawings, wherein like numerals denote like elements.

[0008] FIG. **1** is a front view of a wearable garment according to an embodiment of the invention;

[0009] FIG. **2** is a front view of a wearable garment according to another embodiment of the invention;

[0010] FIG. **3**A is a partial front view of the wearable garment of FIG. **1** with a first target block removed.

[0011] FIG. **3**B is a partial back view of the wearable garment of FIG. **1**;

[0012] FIG. **4** is a perspective view of a target block according to an embodiment of the invention;

[0013] FIG. **5** is an exploded perspective view of a schematic illustrated the target block of FIG. **4**;

[0014] FIG. **6** is a front view of the target block of FIG. **4**;

[0015] FIG. **7** is a side perspective view of the target block of FIG. **4**; and

[0016] FIG. **8** is a front view of the target block of FIG. **4** when exposed to water.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] The following detailed description is exemplary in nature and is not intended to limit the scope, applicability, or configuration of the invention in any way. Rather, the following description provides some practical illustrations for implementing exemplary embodiments of the present invention. Examples of constructions, materials, dimensions, and manufacturing processes are provided for selected elements, and all other elements employ that which is known to those of ordinary skill in the field of the invention. Those skilled in the art will recognize that many of the noted examples have a variety of suitable alternatives.

[0018] Embodiments of the invention include a wearable garment with a wetness indicator for use in recreational water

shooting games. Such recreational games may involve a player shooting a target player with a water squirt gun. The water shooting game may be played as a two-player game, or as a team sport between two or more teams. In such games, the team with the least number of water hits may win a game. Alternatively, or in addition, the team with the most number of dry targets may be rewarded points. The wearable garment can be a vest, a sports jersey, a shirt, a jacket, shorts, or similar sportswear to be worn while playing recreational water shooting gams.

[0019] FIG. **1** shows a wearable garment **100** according to some embodiments of the invention.

[0020] The garment can be a vest as shown in the illustrated embodiment, or any other garment that may be worn by a player during sporting activities (e.g., shorts, socks etc.) The garment **100** may be made of fabrics such as cotton, polyester, spandex or similar synthetic fabrics. The garment **100** may include a first surface **102** and a first target block **104** removably coupled to the first surface **102**. In the illustrated embodiment, the first surface **102** is a front surface of the garment **100**. The first target block **104** acts as a wetness indicator during game play in recreational water shooting games. FIG. **2** shows a wearable garment **200** according to another embodiment. In this embodiment, the target blocks are integrally formed with the garment **200**.

[0021] With continued reference to FIG. **1**, the wearable garment **100** may include a pair of sleeves **106** coupled to the first surface **102**. The sleeves **106** can be removably coupled to a second target block **108** and a third target block **110**. The wearable garment **100** can include a second surface (not shown) opposite the first surface **102**. The second surface can be coupled to the sleeves **106**. In such embodiments, the second surface (not shown) can be the back surface of the garment. As seen in FIG. **3**B, the second surface can include a fourth target block **112**. The first and second surfaces and the sleeves **106** can be sown together as is shown in FIG. **1**. In some embodiments, the first, second, third and fourth target blocks **104**, **108**, **110**, **112** are removably coupled the wearable garment **100**. As seen in FIG. **3**A, the wearable garment **100** can include a mesh pocket **114** coupled to the front or back surfaces or sleeves to enclose the target blocks. In alternate embodiments, the first target block **104** may include a hook portion of a hook-and-loop fastener (not shown). The hook portion (not shown) can be removably coupled to a loop portion (not shown). The loop portion can be coupled to the garment (e.g., the first or second surface, or sleeves). Such embodiments allow for a player to remove the target block **104** when it is hit by water from a water squirt gun and replace it with a dry target block without interrupting the game.

[0022] Referring now to FIGS. **4** and **5**, the first target block **104** includes a back surface **116**, a reticulated porous body **118** supported by the back surface **116**, and a front surface **120**. The back surface **116** can act as a support surface (e.g., a plastic plate) supporting the reticulated porous body **118**. In some embodiments, a first layer **122** can be provided on top of the front surface **120**. The first layer **122** may act as a second support surface (e.g., a plastic plate) and support the reticulated porous body **118**. The back surface **116** and the first layer **122** may be made of a polymer (e.g., PET plastics) and transparent to visible light. In some embodiments, the reticulated porous body **118** can be transparent to visible light. The target block **104** can retain its shape when exposed to water. For instance, the first target block **104** has an initial shape (e.g., cylindrical, cubical). During game play, the first target block **104** can be exposed to water. The properties of the first target block **104** (described further below), allow the first target block **104** to retain water during game play. In such embodiments, the first target block **104** can retain its initial shape when wet. The back surface **116** may assist the first target block **104** in retaining its shape when wet. The back surface **116** can be a rigid plastic surface that provides support for the reticulated porous body **118**.

[0023] With continued reference to FIGS. **4** and **5**, the front surface **120** of the target block **104** can include a coating **124** applied on the front surface. In some embodiments, the coating can be applied on the first layer **122**. In other embodiments, the coating **124** can be directly applied on the front surface **120** of the target block **120**. The coating **124** may be applied over an indicia **126**, best seen in FIGS. **7** and **8**. As shown in FIG. **8** an indicia **126** may be applied on the front surface **120** of the reticulated porous body **118**, and the coating **124** can be applied on top of the indicia **126**. Alternatively, the indicia **126** may be applied on the back surface **116** as shown in FIG. **7**. In the illustrated embodiment best seen in FIGS. **7** and **8**, the indicia **126** is a pattern (e.g., a plus sign or the letter 'X') painted on the front surface **120**. Alternatively, the indicia **126** may be placed on the first layer **122**. Other indicia such as a colored region (e.g., a red square) or a word or symbol (e.g., the word 'HIT') can be used instead of or in addition to the pattern to indicate that the target block **104** is wet. The indicia **126** may be provided by any known methods. For instance, the indicia **126** may be painted at the desired location (e.g., front surface **120**, back surface **116**). Alternatively, the indicia **126** may be applied on the first layer **122** or the back surface **116** using an adhesive. The coating **124** can be opaque when the front surface is dry, and become transparent to visible light when the front surface is exposed to water, in order to reveal the indicia **126** placed on the front surface **120**, or on the first layer **122**, or on the back surface **116**. Such embodiments may allow players to visualize if a target player has been hit by water. The coating **124** may not become completely transparent to visible light when exposed to water. The coating **124** may become translucent enough to allow a user to visibly see the indicia **126** on the front surface **120**, first layer **122** or on the back surface **116**.

[0024] As seen in FIG. **6**, the coating **124** can include a pigment with hydrochromic properties. For instance, the coating **124** may include a water-based acrylic paint such as Hydro Chromic White paint or ink. The coating **124** may include a binder allowing the coating to adhere to a surface when it is applied. The binder may allow the coating **124** to adhere to polymer materials, such as polystyrene or polyurethane or a material of which the target block **104** is made. When applied to the front surface of the target block **104**, the coating **124** may stay transparent for a duration of time during which water is retained in the reticulated porous body **118**. Once water is removed from the reticulated porous body **118** (e.g., by applying a force on the target block or by evaporation to ambient air) the coating **124** may turn opaque again and the first layer **122** with the indicia **126** (best seen in FIG. **8**) may become invisible. In an exemplary embodiment, the coating **124** turns white when the reticulated porous body **118** is dry.

[0025] Referring now to FIGS. **6** and **7**, the reticulated porous body **118** of the first target block **104** can include a plurality of open cellular pores **128**. The reticulated porous body **118** of the first target block **104** can retain water in the plurality of open cellular pores **128** by capillary action. For instance, the pores **128** may form capillary-shaped passages

wherein water could be drawn in due to surface tension of water and wetting properties of material of the reticulated porous body **118**. The reticulated porous body **118** may be made of a polymer foam such as polyurethane foam or polystyrene foam. The material used in fabricating the reticulated porous body **118** does not limit the scope of the invention. In some embodiments, the reticulated porous body **118** may be of a thickness that allows indicia **126** placed on the back surface **116**, to be visible when viewed via the front surface **120**. Alternatively, the reticulated porous body **118** may turn transparent or translucent to allow the indicia **126** on the back surface **116** to be visible. In such embodiments, when the coating **124** is exposed to water and turns transparent (or translucent), any indicia **126** on the front surface **120** (or on the first layer **122**), as well as any indicia **126** on the back surface **116** may become visible. The plurality of open cellular pores **128** may be interconnected with each other to form passageways (not shown) for water retained in the open cellular pores **128**. The open cellular pores **128** may transport water held therein through the passageways by diffusion. The reticulated porous body **118** may turn transparent or translucent when exposed to water. For instance, when the open cellular pores **128** hold water, the reticulated porous boy **118** may turn transparent or translucent. The reticulated porous body **118** of the first target block **104** retains water for a duration between about 15 minutes and about 50 minutes when exposed to standard atmospheric conditions, thereby allowing the indicia **126** of the first layer **122** to be visible behind the transparent coating **124**. The reticulated porous body **118** can be configured to retain water for a longer duration (e.g., 1 hour, 2 hours, 3 hours, 5 hours etc.) The duration for which the target block **104** retains water may depend on the size and shape of the open cellular pores **128**.

[0026] Embodiments of the wearable garment described herein can be used for playing recreational water shooting team games. Such recreational water shooting games may be played between two players or between two teams. While two player games are relatively well known, embodiments of the invention include a recreational water shooting game that can be played as a team sport. Each team may include multiple players. In such embodiments, each player may be provided with a wearable garment **100** with a wetness indicator such as those described herein. The game can then be commenced. Each player in a team aims to shoot a player of an opposite team with a water squirt gun. One or more non-participants of the game may be designated as a "referee" and/or a "scorer", to determine if a player has been hit with water and to count the number of players that have been hit. Once the game ends, the team with the least number of hits may be designated as the winning team.

[0027] The referee may determine if a player has been hit based on the target block's state. For instance, if the player has been hit, the target block retains water in its reticulated porous body, thereby having the coating turn transparent or translucent to reveal an indicia (e.g., a colored pattern, the word 'HIT', a cross sign etc.). In the embodiment shown in FIG. **8**, the indicator is a colored 'X' symbol. The referee may then signal the player to remove the wet target block. The player may remove the wet target block and hand it over to the scorer who may replace the wet target block with a dry target block. The dry target block has identical properties as the wet target block, and is initially dry when replaced.

[0028] The player may then operatively connect the dry target block (e.g., place it in a mesh pocket, or connect using hook-and-loop fasteners) to the wearable garment and rejoins the water shooting team game. The scorer may deduct one or more points from the team's score for each wet target (e.g., two points per wet target block). The scorer may also award one or more points for each target block that was not hit (e.g., two points per unexposed target block). The game is then allowed to end after a certain time. At the end of the game, the scorer counts the wet and unexposed target blocks to determine the total score for each team. At the end of the game, the team with the most number of points is declared the winning team.

[0029] Alternatively or in addition to the embodiments described above, the wearable garment may be provided with four target blocks. Thus, each player wears a garment with four target blocks. The game can then be played as described herein. The target blocks may also be color-coded or another similar distinct indicator to facilitate easier scoring. For instance, the wet target blocks of a first team may include a red visual indicator and the wet target blocks of a second team may include a blue visual indicator. Alternately, or in addition, each team may have a team logo, or a pattern or word that is distinct from the opponent team to help facilitate score-keeping. The scorer may then look at the color, logo, pattern or word on the wet target block to determine if the target block belongs to the first team or the second team.

[0030] Wearable garments with removable and replaceable target blocks such as those described herein can allow the water shooting team game to continue without interruption when a target block has been exposed to water. For instance, a wet target block is replaced by a dry target block without interrupting the water shooting team game. Such target blocks also have hydrochromic properties and water retention properties that allow the target blocks to provide a visual indicator until the water shooting team game is ended. For instance, the reticulated porous body of the target blocks may retain water between about 15 minutes and about 50 minutes, or a sufficiently longer interval of time (e.g., greater than 50 minutes, 1 hour, 2 hours, up to three hours, up to five hours, etc.) allowing a player to replace the wet target block with a dry target block, and allowing the scorer to determine points to deduct accurately.

[0031] Thus, embodiments of the invention are disclosed. Although the present invention has been described in considerable detail with reference to certain disclosed embodiments, the disclosed embodiments are presented for purposes of illustration and not limitation and other embodiments of the invention are possible. One skilled in the art will appreciate that various changes, adaptations, and modifications may be made without departing from the spirit of the invention.

What is claimed is:

1. A wearable garment for recreational water shooting games, comprising:

a first surface; and

a first target block removably coupled to the first surface, the first target block comprising

a back surface,

a reticulated porous body supported by the back surface, and

a front surface comprising a coating,

the coating being opaque when the front surface is dry, the coating adapted to become transparent to visible light when the front surface is exposed to water, in order to reveal an indicia underneath the coating.

2. The wearable garment of claim **1**, further comprising a mesh pocket coupled to the first surface, wherein the mesh pocket is adapted to enclose the first target block such that the front surface of the first target block is adjacent a mesh layer of the mesh pocket.

3. The wearable garment of claim **1**, wherein the back surface of the first target block includes a hook portion of a hook-and-loop fastener, the hook portion removably coupled to a loop portion, the loop portion coupled to the first surface.

4. The wearable garment of claim **1**, wherein the reticulated porous body of the first target block comprises a plurality of open cellular pores adapted to retain water by capillary action.

5. The wearable garment of claim **1**, wherein the reticulated porous body of the first target block is transparent to visible light to reveal an indicia positioned on the back surface when the coating becomes transparent to visible light.

6. The wearable garment of claim **5**, wherein the plurality of open cellular pores are interconnected with each other such that the plurality of open cellular pores form passageways for water retained in the plurality of open cellular pores.

7. The wearable garment of claim **6**, wherein the plurality of open cellular pores are adapted to transport water held therein through the passageways by diffusion.

8. The wearable garment of claim **6**, wherein the reticulated porous body of the first target block is adapted to retain water for a duration between about 15 minutes and about 50 minutes when exposed to standard atmospheric conditions.

9. The wearable garment of claim **1**, further comprising a pair of sleeves coupled to the first surface, the pair of sleeves removably coupled to a second target block and a third target block.

10. The wearable garment of claim **9**, further comprising a second surface opposite the first surface, the second surface coupled to the pair of sleeves, the second surface including a fourth target block.

11. The wearable garment of claim **1**, wherein the coating comprises a pigment with hydrochromic properties.

12. The wearable garment of claim **1**, wherein the indicia may be applied on one of the front surface of the reticulated porous body, the back surface of the reticulated porous body, and a first layer placed on the front surface of the reticulated porous body and coated with the coating.

13. The wearable garment of claim **1**, wherein the first target block has an initial shape, the first target block adapted to retain the initial shape when exposed to water.

14. A method of using a wearable garment for playing recreational water shooting team game between two teams, wherein each player in a team aims to shoot a player of an opposite team with a water squirt gun, the method comprising:

providing each player with the wearable garment, the wearable garment comprising:

a first surface,

a first target block removably coupled to the first surface, the first target block comprising

a back surface,

a reticulated porous body supported by the back surface, and

a front surface comprising a hydrochromic coating, the hydrochromic coating being opaque when the front surface is dry and transparent to visible light when the front surface is wet, the hydrochromic coating revealing an indicia when the front surface is wet;

commencing the water shooting team game;

determining if the first target block has been exposed to water from the water squirt gun;

removing the first target block exposed to water; and

replacing the first target block exposed to water with a second target block, the second target block having identical properties as the first target block, the second target block being dry when replaced.

15. The method of claim **14** further comprising, providing the wearable garment with four target blocks.

16. The method of claim **14** further comprising, allowing the water shooting team game to continue without interruption when the first target block has been exposed to water.

17. The method of claim **16**, wherein the first target block is replaced by the second target block without interrupting the water shooting team game.

18. The method of claim **14** further comprising, ending the water shooting team game, and determining a number of target blocks of each team exposed to water.

19. The method of claim **18**, wherein each target block of the number of target blocks exposed to water show the visual indicator until the water shooting team game is ended.

20. The method of claim **18** further comprising,

deducting points from a first team or a second team for each target block of the number of target blocks of the first team or the second team that has been exposed to water; and

awarding points to the first team or the second team for one or more target blocks of the first team or the second team that has not been exposed to water.

* * * * *