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(54) **CLEANING CLOTH**

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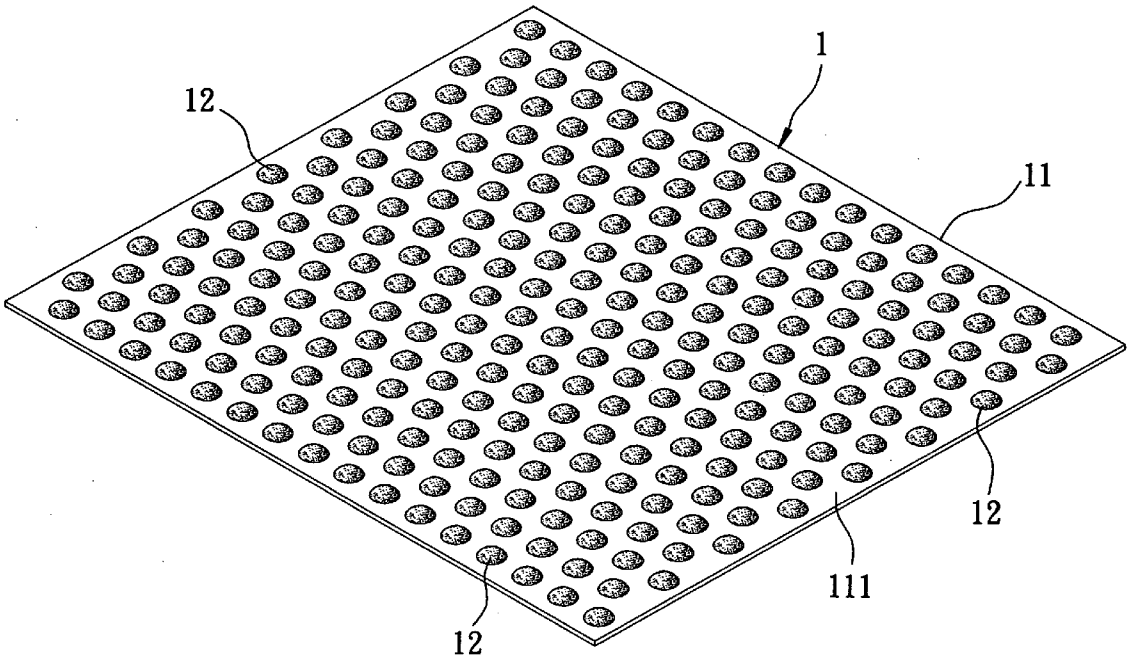
(57) **ABSTRACT**

A cleaning cloth includes a single piece of a polyvinyl alcohol (PVA)-based sheet that has a working surface formed with a plurality of protrusions protruding therefrom. In one preferred embodiment, any two adjacent ones of the protrusions have an interval ranging from 1.0 to 10.0 mm therebetween. In another preferred embodiment, each of the protrusions has a height ranging from 0.1 to 1.0 mm relative to the working surface.



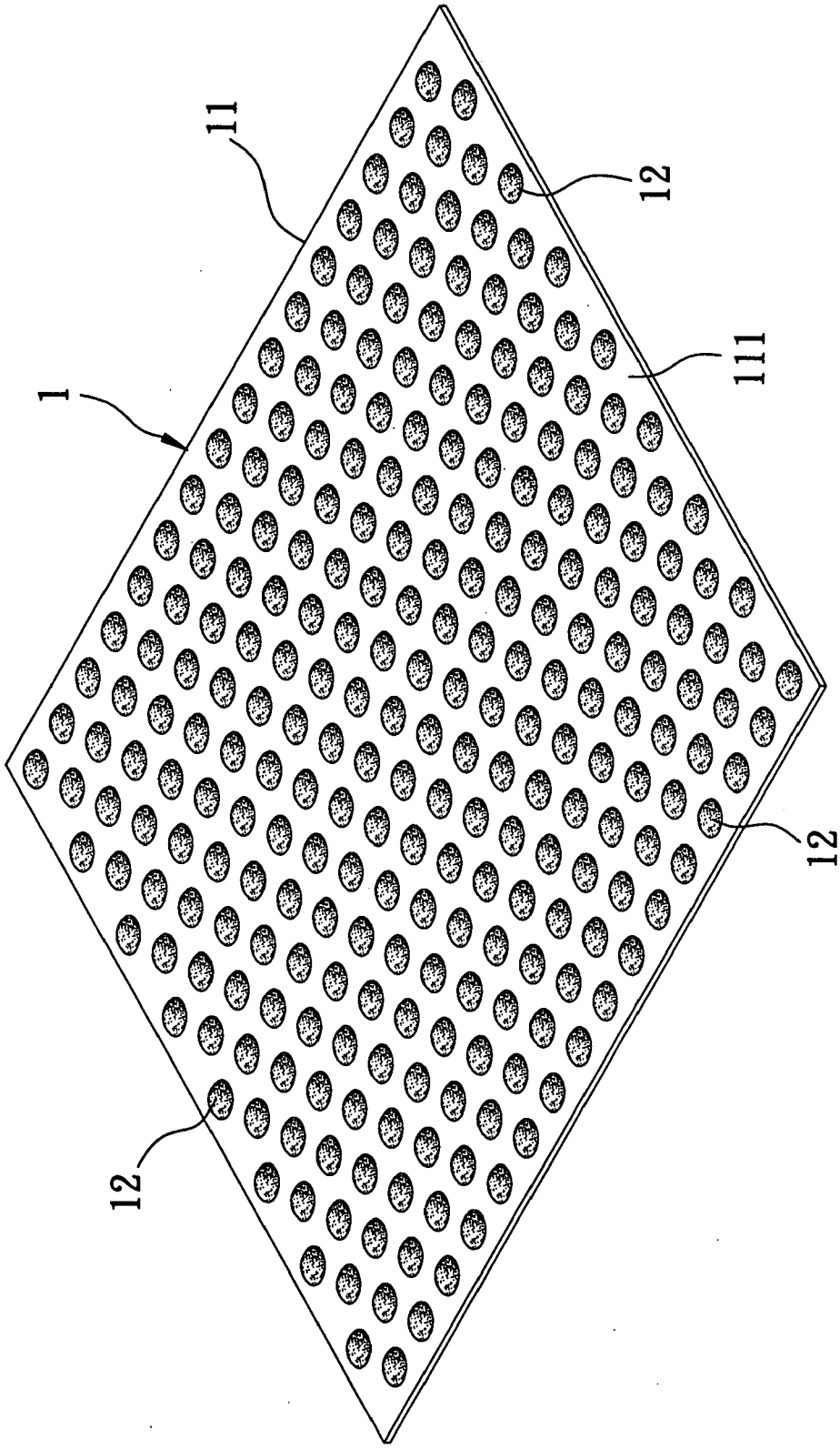


FIG. 1

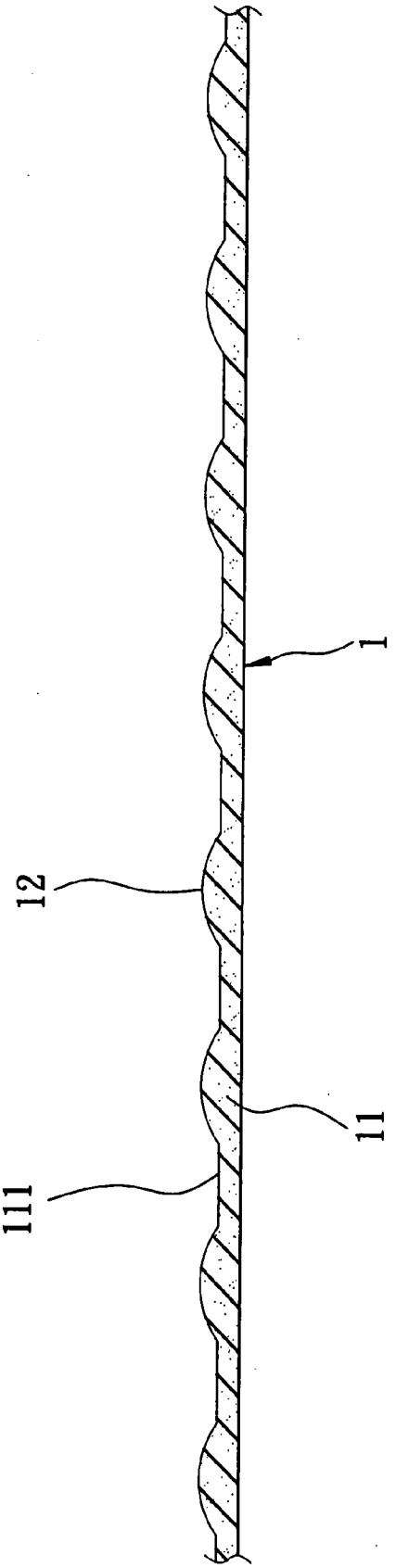


FIG. 2

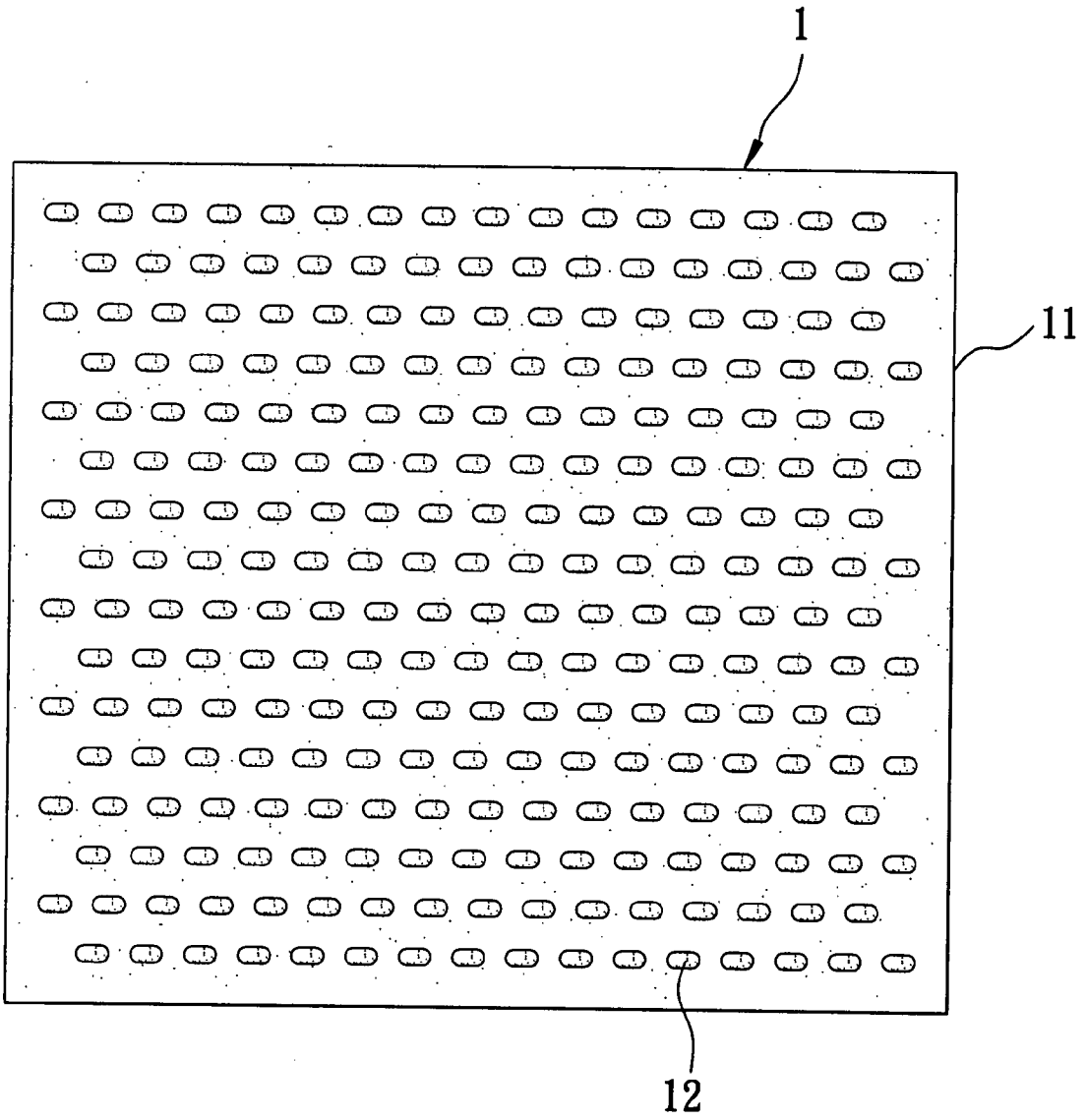


FIG. 3

CLEANING CLOTH

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to a cleaning cloth, more particularly to a cleaning cloth including a single piece of a polyvinyl alcohol (PVA)-based sheet that has a working surface formed with protrusions protruding therefrom.

[0003] 2. Description of the Related Art

[0004] PVA is a stable, nontoxic and water-soluble synthetic polymer with hydrophilic and hydrophobic groups. Since PVA is excellent in film-forming, abrasion-resistance, tensile strength, water-absorption and flexibility, it has been widely applied to various industries, such as textile and paper-making industries.

[0005] Conventional cleaning cloths made from PVA include a porous hydrophilic matrix formed with pores communicated with each other so as to have a good water-absorption property. However, the microstructure of the porous matrix will greatly increase specific surface area of the conventional cleaning cloths. Hence, when the conventional cleaning cloths are used in wiping a surface of an article, they are unable to move smoothly on the surface, thus resulting in inconvenience during use.

SUMMARY OF THE INVENTION

[0006] Therefore, the object of the present invention is to provide a cleaning cloth having an improved structure so as to alleviate the aforesaid drawback of the prior art.

[0007] According to this invention, a cleaning cloth includes a single piece of a polyvinyl alcohol (PVA)-based sheet that has a working surface formed with a plurality of protrusions protruding therefrom.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Other features and advantages of the present invention will become apparent in the following detailed description of the preferred embodiments of this invention, with reference to the accompanying drawings, in which:

[0009] FIG. **1** is a perspective view to illustrate the first preferred embodiment of a cleaning cloth according to this invention;

[0010] FIG. **2** is a fragmentary sectional view of the first preferred embodiment shown in FIG. **1**; and

[0011] FIG. **3** is a schematic view to illustrate the second preferred embodiment of a cleaning cloth according to this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] Referring to FIGS. **1** and **2**, the first preferred embodiment of a cleaning cloth **1** according to this invention includes a single piece of a polyvinyl alcohol (PVA)-based sheet **11** that has a working surface **111** formed with a plurality of protrusions **12** protruding therefrom. Preferably, the polyvinyl alcohol (PVA)-based sheet **11** is made from PVA.

[0013] In one preferred embodiment, any two adjacent ones of the protrusions **12** have an interval ranging from 1.0 to 10.0 mm therebetween. In yet another preferred embodiment, the protrusions **12** are arranged in arrays, and any two adjacent ones of the arrays have an interval ranging from 1.0 to 10.0 mm therebetween. Preferably, each of the protrusions **12** has a height ranging from 0.1 to 1.0 mm relative to the working surface **111**. More preferably, each of the protrusions **12** has a circular cross-section. Most preferably, the circular cross-section of each of the protrusions **12** at the working surface **111** has a diameter ranging from 1.0 to 4.0 mm.

[0014] FIG. **3** illustrates the second preferred embodiment of the cleaning cloth according to this invention. In this preferred embodiment, each of the protrusions **12** has an oval cross-section. Preferably, the oval cross-section of each of the protrusions **12** at the working surface **111** has a maximum diameter ranging from 1.0 to 4.0 mm.

Friction Test

[0015] A sample of the cleaning cloth according to this invention was prepared from PVA Chamois (Item No. TJC-770, obtained from Twenty-First Century Intl., Deve. Co., Ltd., Taiwan). The sample has a size of 100 mm×150 mm and is formed with a plurality of protrusions. Each of the protrusions has a circular cross-section, a diameter of 2.5 mm, and a height of 0.7 mm. The interval between any two adjacent ones of the protrusions is 2 mm. The sample was subsequently cut into three equal pieces **1**, **2**, and **3**. Each of the pieces **1**, **2**, and **3** was attached to a wooden board, and the wooden board was subsequently placed on a glass plate in such a manner that the corresponding one of the pieces **1**, **2**, and **3** was in contact with a surface of the glass plate.

[0016] A load of 2 kg was applied to a surface of the wooden board opposite to the surface of the glass plate. A horizontal force was applied to the glass plate steadily. A minimum value of the horizontal force that was required to move the glass plate was recorded as the pulling force. Coefficient of friction (μ) of the cleaning cloth was calculated by dividing the value of the pulling force by the value of the load (2 kg).

[0017] A comparative sample of a comparative cleaning cloth was prepared in a manner similar to the above sample of this invention, except that the comparative cleaning cloth was formed with no protrusions. The comparative sample was likewise subjected to measurement of coefficient of friction (μ). Results of the coefficient of friction (μ) of the above sample and comparative samples are shown in the following Table 1 and Table 2, respectively.

TABLE 1

Pieces of the Sample	Coefficient of Friction (μ)
Piece 1	0.31
Piece 2	0.27
Piece 3	0.33
Average of the value (μ) of pieces 1 to 3	0.30

TABLE 2

Pieces of the Comparative Sample	Coefficient of Friction (μ)
Piece 1	0.44
Piece 2	0.43
Piece 3	0.40
Average of the value (μ) of pieces 1 to 3	0.42

[0018] Based on the results shown in Table 1 and Table 2, it is apparent that the cleaning cloth with protrusions according

to this invention has a lower coefficient of friction than that of the comparative cleaning cloth without the protrusions. Since the cleaning cloth of this invention is in contact with an article only in the portion formed with the protrusions when the cleaning cloth is used for wiping the article, the contact area between the cleaning cloth and the article is reduced so as to decrease frictional resistance.

[0019] It is noted that the interval between any two adjacent ones of the protrusions **12** of the cleaning cloth **1** of this invention has a function of receiving contaminants, such as dust therein. Hence, not only can the cleaning cloth **1** move smoothly on the article to be cleaned, the article can also be efficiently cleaned. Besides, since the cleaning cloth **1** is relatively flexible, the contaminants received in the intervals among the protrusions **12** will be squeezed out during washing.

[0020] In addition, by virtue of the interval between any two adjacent ones of the protrusions **12** ranging from 1.0 to 10 mm and the height of each protrusion **12** ranging from 0.1 to 1.0 mm relative to the working surface **111**, each of the protrusions **12** is able to efficiently remove the contaminants on the article to be cleaned. Consequently, the contaminants on the article can be efficiently and thoroughly removed.

[0021] While the present invention has been described in connection with what are considered the most practical and preferred embodiments, it is understood that this invention is not limited to the disclosed embodiments but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation and equivalent arrangements.

What is claimed is:

1. A cleaning cloth, comprising:

a single piece of a polyvinyl alcohol (PVA)-based sheet that has a working surface formed with a plurality of protrusions protruding therefrom.

2. The cleaning cloth of claim **1**, wherein said PVA-based sheet is made from PVA.

3. The cleaning cloth of claim **1**, wherein any two adjacent ones of said protrusions have an interval ranging from 1.0 to 10.0 mm therebetween.

4. The cleaning cloth of claim **1**, wherein each of said protrusions has a circular cross-section.

5. The cleaning cloth of claim **4**, wherein the circular cross-section of each of said protrusions at said working surface has a diameter ranging from 1.0 to 4.0 mm.

6. The cleaning cloth of claim **1**, wherein each of said protrusions has an oval cross-section.

7. The cleaning cloth of claim **6**, wherein the oval cross-section of each of said protrusions at said working surface has a maximum diameter ranging from 1.0 to 4.0 mm.

8. The cleaning cloth of claim **1**, wherein each of said protrusions has a height ranging from 0.1 to 1.0 mm relative to said working surface.

9. The cleaning cloth of claim **1**, wherein said protrusions are arranged in arrays, and wherein any two adjacent ones of said arrays have an interval ranging from 1.0 to 10.0 mm therebetween.

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