

TITLE**SUFFICIENTLY RIGID YET EASILY DECOMPOSABLE TOILET
PAPER****BACKGROUND OF THE INVENTION**5 **1. Field of the invention**

The present invention relates to a toilet paper, more particularly to a sufficiently rigid yet easily decomposable toilet paper.

2. **Description of the Related Art**

10 Toilet paper is now widely and necessarily used by people in their daily life and is considered as a milestone the development of human civilization. When the industrial techniques keep advancing toward the production of toilet paper with better smell, softness and absorbency, it is more important for the human being to consider what kind of toilet paper shall less easily cause a clogged flush toilet and not adversely affect our
15 environment ecology.

The conventional toilet paper in the form of single sheet is usually rectangular in shape and has sufficient softness and flexibility. It is common habit of people to use such conventional toilet paper by folding one or more sheets of them into four. Such folded sheets of toilet paper
20 forms a thicker and solid body when they are thrown into the flush toilet and therefore requires longer time to be decomposed in a cesspool through microorganism and water. Another problem very possibly caused by such folded and bulky toilet paper is a clogged flush toilet and even a jammed sewerage system which is obviously a threat to the smooth drainage during
25 a rainy season.

It is therefore desirable to have some kind of toilet paper which has

substantially equivalent material as that of the conventional toilet paper but has improved structural design to facilitate the decomposition thereof. To meet this demand, the inventor has therefore developed a sufficiently rigid yet easily decomposable toilet paper which has sufficient rigidity to permit
5 users to use them conveniently and satisfactorily while permits the toilet paper itself to be easily decomposed in water.

SUMMARY OF THE INVENTION

One objective of the present invention is to provide a sufficiently rigid yet easily decomposable toilet paper which is divided into four parts,
10 namely, an upper left, a lower left, an upper right and a lower right parts. All the four parts are formed with a plurality of broken lines. The broken lines are formed a certain pattern. The broken lines on every two diagonally opposite parts of said paper are formed the same pattern. The pattern on every two adjacent parts of said paper is shifted a distance each
15 other. Each the broken lines has a serial of very fine slits. The very fine slits of two adjacent broken lines are alternately positioned. The broken lines form locally weakened portions easily decomposed in water without causing the problem of a clogged flush toilet.

BRIEF DESCRIPTION OF THE DRAWINGS

20 Fig. 1 shows a plan view of the toilet paper according to the first embodiment of the invention.

Fig. 2 shows a fragmentary and enlarged plan view of Fig. 1.

Fig. 3 shows an exploded perspective view showing the relation of the four parts of the toilet paper of the present invention in position when
25 the toilet paper is folded into four.

Fig. 4 shows a perspective view of the toilet paper of the present invention in a folded-into-four state.

Fig. 5 shows a plan view of the toilet paper according to the second embodiment of the invention.

Fig. 6 shows a fragmentary and enlarged plan view of Fig. 5.

Fig. 7 shows a plan view of the toilet paper according to the third embodiment of the invention.

Fig. 8 shows a fragmentary and enlarged plan view of Fig. 7.

Fig. 9 shows a plan view of the toilet paper according to the fourth embodiment of the invention.

Fig. 10 shows a fragmentary and enlarged plan view of Fig. 9.

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DETAILED DESCRIPTION OF THE INVENTION

Referring to Fig. 1, the present invention relates to a toilet paper which has sufficient rigidity yet is easily decomposable in water. The toilet paper of the present invention has sufficient rigidity because it is suitable for folding into four layers as a user would usually do and is therefore has better rupture strength. On the other hand, the toilet paper of the present invention is physically easy decomposable in water because it provides large contact area with water.

The toilet paper of the present invention is substantially a sheet of rectangular paper. An overall surface of the paper is substantially divided into four equal parts, including an upper left part 1, a lower left part 2 below the part 1, an upper right part 3 to the right side of the part 1, and a lower right part 4 diagonally opposite to the part 1. All of these four parts 1, 2, 3 and 4 are formed on their surface with a plurality of parallel broken lines 11, 21, 31 and 41, respectively. These broken lines 11, 21, 31 and 41 vertically cut into the surface of the toilet paper and respectively include a plurality of very fine slits. Taking the broken line 11 as an example, each line 11 is formed from a serial of very fine slits 111, and the very fine slits

111 in every two adjacent broken lines 11 are alternately positioned, as shown in Fig. 2. An internal peripheral wall of each very fine slit 111 creates a contact area with water and thereby considerably increases the total contact area of the toilet paper with water, permitting the toilet paper to be more easily decomposed in water. This situation is applicable to the broken lines 21, 31 and 41, too.

Furthermore, the broken lines in every two adjacent parts of the four parts of the toilet paper extend in two directions normal to one another. The first embodiment as shown in Fig. 1 is that broken lines 11 extend in the part 1 in a vertical direction while broken lines 21, 31 in the parts 2, 3, respectively, extend in a horizontal direction, that is normal to the extending direction of the broken lines 11. And, broken lines 41 extend in a vertical direction, too, to normal the extending direction of the broken lines 21 and 31.

Please now refer to Figs. 3 and 4 at the same time. Fig. 4 illustrates that the toilet paper of the invention is folded into four. Fig. 3 illustrates that the four parts 1, 2, 3 and 4 of the toilet paper in a cut-off and separate form for better show their relation in position when the toilet paper is folded into four. As shown, when a sheet of the toilet paper is folded into four as a user would usually do before he or she uses the paper in a toilet room, the broken lines on every two adjacent and superposed layers formed from two of the four parts 11, 21, 31, 41 extend in two directions normal to one another. The alternate extending directions of broken lines 11, 21, 31, 41 on these four parts or layers 1, 2, 3, 4 establish a reinforcement to the rupture strength of the toilet paper. More particularly, these alternate extending directions of broken lines 11, 21, 31, 41 on the folded toilet paper allow the paper to resist a stronger force applied by the user to the paper in the direction of Z axis.

When the used toilet paper is thrown into a flush toilet and is immersed in water (either clean water, cesspool water, or sewerage), the very fine slits

111 and so on forming the broken lines 11, 21, 31, 41 allow the toilet paper to absorb large quantity of water and is completely soaked, swollen, and decomposed by water from all three directions of X, Y, and Z axes. The broken lines 11, 21, 31, 41 cause the toilet paper to form locally weakened portions in a plane defined by the X and Y axes. Such locally weakened portions also permit the toilet paper to be more easily decomposed.

Referring to Fig. 5 and Fig. 6, according to the second embodiment of the present invention, these four parts 1, 2, 3, 4 are formed on their surface with a plurality of broken lines 12, 22, 32 and 42, respectively. These broken lines 12, 22, 32 and 42 have a plurality of very fine slits. Taking the broken line 12 as an example, the broken line 12 is formed from a serial of very fine slits 121. The broken lines 12 in the part 1 are formed as a crossed shape, as shown in Fig. 6. The broken lines on every two diagonally opposite parts (for example, the first part 1 and the fourth part 4) are formed the same pattern (a plurality of cross shape). The pattern on every adjacent parts (for example, the first part 1 and the second part 2) is shifted a distance each other.

Referring to Fig. 7 and Fig.8, according to the third embodiment of the invention, these four parts 1, 2, 3, 4 are formed on their surface with a plurality of broken lines 13, 23, 33 and 43, respectively. These broken lines 13, 23, 33 and 43 have a plurality of very fine slits. Taking the broken line 13 as an example, the broken line 13 is formed from a serial of very fine slits 131. The broken lines 13 in the part 1 are formed as a rectangular shape, as shown in Fig. 8. The broken lines on every two diagonally opposite parts (for example, the first part 1 and the fourth part 4) are formed the same pattern (a plurality of rectangular shape). The pattern on every adjacent parts (for example, the first part 1 and the second part 2) is shifted a distance each other.

Referring to Fig. 9 and Fig.10, according to the fourth embodiment of the present invention, these four parts 1, 2, 3, 4 are formed on their surface

with a plurality of broken lines 14, 24, 34 and 44, respectively. These broken lines 14, 24, 34 and 44 have a plurality of very fine slits. Taking the broken line 14 as an example, the broken line 14 is formed from a serial of very fine slits 141. The broken lines 14 in the part 1 are formed as a flower shape, as shown in Fig. 10. The broken lines on every two diagonally opposite parts (for example, the first part 1 and the fourth part 4) are formed the same pattern (a plurality of flower shape). The pattern on every adjacent parts (for example, the first part 1 and the second part 2) is shifted a distance each other.

Although the rupture strength, the absorbency, the softness, and many other parameters of features of the toilet paper are generally decided by the types of pulp, the arrangement or organization of fibers (that is, the fibers directions as shown from paper texture, the cross section and the Z axis direction of the toilet paper), the chemical additives, etc., the toilet paper of the present invention is provided with a better physical feature which enables better decomposability of the toilet paper.

Therefore, the toilet paper of the present invention is characterized in that broken lines are provided on four parts of the toilet paper to form a certain pattern alternately, so that a sheet of toilet paper folded into four layers shall have enhanced rupture strength to resist a force applied in the direction of Z axis. The used toilet paper thrown into the flush toilet is more easily decomposed by water due to these broken lines. Problems such as clogged flush toilet and jammed sewerage systems can be minimized to protect our environmental ecology.

While embodiments of the invention have been illustrated and described, various modifications and improvements can be made by those skilled in the art. The embodiments of the present invention are therefore described in an illustrative but not restrictive sense. It is intended that the present invention may not be limited to the particular forms as illustrated, and that all modifications which maintain the spirit and scope of the present

invention are within the scope as defined in the appended claims.

WHAT IS CLAIMED IS:

1. A sufficiently rigid yet easily decomposable toilet paper formed a sheet of substantially rectangular paper, said toilet paper comprising:

- 5 a first part located at an upper left corner of said paper;

 a second part located at a lower left corner of said paper;

 a third part located at an upper right corner of said paper;

 a fourth part located at a lower left corner of said paper;

 wherein each of said first, second, third and fourth parts being
10 formed on their surfaces with a plurality of broken lines, said broken lines
on every parts formed a certain pattern, said broken lines on every two
diagonally opposite parts formed the same pattern, said pattern on every
two adjacent parts of said paper being shifted a distance each other, said
broken lines having a serial of very fine slits, and said very fine slits of
15 every two adjacent broken lines being alternately positioned.

2. The toilet paper as claimed in Claim 1, wherein the pattern is a plurality of cross shape.

3. The toilet paper as claimed in Claim 1, wherein the pattern is a plurality of rectangular shape.

20 4. The toilet paper as claimed in Claim 1, wherein the pattern is a plurality of flower shape.

