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(54) **WATER CLOSET.**

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GB-A- 507 908
GB-A- 1 099 707
JP-U-58 115 587
JP-U-62 021 180
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Description

The present invention relates to a water closet having a drain hole above a floor, according to the preamble part of claim . Such a closet is known from GB-A-507 908.

It will be noted that in GB-A-507 908 the limb 13 gradually increases downwardly in cross-section and is then suddenly decreased in cross-section by a projection 15 extending into the limb 13. Such a construction may indeed cause a quicker build-up of the siphon effect as is stated to be the case in this prior art but the overall effect is to drastically reduce the rate of flow during the siphon effect. This is a great draw back and serves to act against an effective clearance of the contents in the bowl of the water closet.

A one-piece closet of a low silhouette type has been heretofor known (for example, see Japanese Utility Model Application Laid-Open No. 106584/1986).

In a water closet of this kind, a height dimension of a flushing tank is adjusted to a closet body as much as possible so as to provide a united impression.

Therefore, a sufficient water head cannot be obtained, and a feed water momentary flow rate which is a great factor to control a flushing function of a closet is extremely low as compared with that of a closet of the type in which a flushing tank is mounted on a closet body and a closet of the type in which a flush valve is used as a feed device.

Generally, a closet of a wall drain type has a core height of a drain hole set to 100 to 150 mm from a floor surface. However, when a one-piece closet of the low silhouette type employs the wall drain type to secure the aforesaid drain hole height, a head from a water surface of a bowl portion to a core of the drain hole decreases and a satisfactory function cannot be exhibited with the aforementioned poor condition attended. Therefore, no one-piece closet of the wall drain type has been present so far.

On the other hand, since a water closet of a one-piece type is handled as a highest-class closet, this one-piece type closet has been desired to be installed in high-class mansions, suite rooms in high-class hotels, and the like,

However, in hotels, mansions and the like, ceiling beams often obstruct drain pipes. In case of high buildings or the like, the height space is often secured by removal of piping space in the ceiling. Therefore, the conventional one-piece type water closet which employs the floor drain type wherein drain pipes need be installed under floor cannot be used to satisfy the above-described demand of the market.

The problem to be solved by the present invention is the provision of a trap drainage of a new construction for a water closet in which the flushing tank is formed integral with a closet body and in which the closet has a drain hole above a floor, the trap drainage being such that a powerful siphon force is obtained".

The solution of this problem is achieved by the features of claim 1.

With the above-described arrangement, according to the aforesaid technical solution of the present invention, at the time of flushing, the vent space is partitioned in a wall-like manner by a sheet of water falling from the weir portion and a rise in a water level of the sump portion, and air within the trap is promptly forced toward the drain hole by a force of water flow so that the pressure in the trap drainage becomes negative pressure.

Accordingly, a siphon effect tends to occur.

Further, when feed from the tank terminates and duration of siphon effect terminates, air is immediately introduced from the notch of the partionning wall, and therefore, timing of air introduction becomes quickened to promptly end the siphon effect.

One embodiment of the present invention will be described hereinafter with reference to the drawings.

In the drawings, reference character (A) designates a closet body, and (B) a flushing tank formed integral with an upper half at the rear thereof, the flushing tank (B) being formed so that a height dimension of the flushing tank (B) is adjusted to the closet body (A) as much as possible to provide a united impression with the closet body (A).

In the closet body (A), a rim water passage (9) provided along the upper edge of a bowl portion (1) is communicated with an intermediate portion heightwise of the flushing tank (B) through a feed chamber (10) provided at the rear of the bowl portion (1), and a discharge opening (11) bored in the bottom side of the bowl portion (1) is communicated with the bottom of the flushing tank (B) through a water guide passage (12) provided outside the bowl portion (1) so that a part of the flushing water within the tank (B) is supplied along the wall surface of the bowl portion 1 from a water injection hole (13)bored in the lower surface of the rim water passage (9) and the remaining greater part thereof is spirally supplied from the discharge opening (11) to the bottom of the bowl portion (1).

Furthermore, in the close body (A), a trap drainage (2) for discharging flush water supplied to the bowl portin (1) outside the closet together with sewage is provided to be communicated with the bowl portion (1).

In the trap drainage (2), an inlet (14) is opened to the bottom of the bowl (1), and an outlet, that is, a drain hole (3) is opened to a substantially intermediate position between the lower end of the flushing tank (B) and the lower end of the closet body (A) at the back of the closet body (A), both the inlet and drain hole (14, 3) being communicated with each other to form a substantially S-character configuration.

That is, the trap drainage (2) is composed of a portion obliquely and upwardly extending from the inlet (14) opened to the bottom of the bowl portion (1)

toward the rear portion of the closet body (A) (hereinafter referred to as a portion a), a portion which is continuous to the upper end of said portion a, substantially vertically downwardly extends and reaches a position lower than a height positions of the inlet (14) and drain hole (3) (hereinafter referred to as a portion b), and a portion which is continuous to said portion b and obliquely and upwardly extends toward the drain hole (3) (hereafter referred to as a portion c), the bottom wall at the upper end of the portion a forming a weir portion (4).

In the trap drainage (2), a diameter of the portion b is gradually reduced downwardly to partially narrow the diameter of the drain hole and forms a sump portion (5) from the lower end of the portion b to the halfway portion of the portion c.

Moreover, in the trap drainage (2), a downwardly extending partitioning wall (7) is formed on the upper wall of the sump (5), more specifically, on the upper wall of a boundary portion between the portions b and c so as to leave a slight vent space (6) between the lower end of the partitioning wall and a water surface or level of the sump (5).

The partitioning wall (7) is provided with a notch (8) having a suitable width from the lower end thereof to the heightwise mid-portion.

The optimum dimension of the vent space (6) is approximately 20 mm in order to induce siphon.

While in the above-described embodiment, the closet of the low silhouette type has been described, it is to be noted that for example, a siphon or siphon-jet closet may be adapted.

(Effect)

The present invention being constructed as described above, there are the following advantages.

(1) The construction is provided in which the vent space is closet in a wall-like manner by water falling from the weir portion and caused a rise in the water level of the sump portion. Therefore, the air within the trap can be quickly forced by the water toward the drain hole to give the interior of the trap negative pressure with respect to the atmosphere so that siphon action easily occurs.

Accordingly, the water feed momentary flow rate is materially low as compared to that of a tank closely connected to a water closet or a closet using a flush valve.

In addition, despite the fact that this closed is a one-piece closet of a low silhouette type wherein when, as a wall drain type, a core height of a drain hole is set to secure about 100 mm from a floor surface, a head from a water level of the bowl portion to the core of the drain hole is small, a fully satisfactory sewage discharge function can be obtained as the wall drain type installation.

Thereby, the closet of the present invention can be installed without any trouble in high buildings, luxury mansions, luxury hotels and the like in which the ceiling beams obstruct underfloor piping and often lack piping spaces in the ceiling, thus making it difficult to install a one-piece closet of a low silhouette type. The closet of the present invention can satisfy with the demand of markets.

(2) By providing the notch on the partitioning wall, when feed of water from the flushing tank terminates and duration of siphon effect terminates, air can be promptly introduced from the notch into the trap, and therefore, the siphon effect can be quickly terminated to restore a water level in the bowl portion, and the depth of seal water can be returned to its original state due to the trap seal.

Incidentally, if a notch is not provided in a partitioning wall, siphon termination time remarkably extends due to the rise in water level of the sump portion and the falling water from the weir portion to make it difficult to secure the depth of sealed water.

It is noted that since at the start of siphon, a water film is formed on the notch by the water bundle from the weir portion, the aforesaid notch will not influence on siphon start time and strength of siphon.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view of a water closet showing one embodiment of the present invention; Fig. 2 is a partly cutaway plan view; Fig. 3 is a sectional view taken on line III-III of Fig. 1; Fig. 4 is a sectional view taken on line IV-IV of Fig. 1; and Fig. 5 is a sectional view taken on line V-V of Fig. 1.

A : closet body
B : flushing tank
1 : bowl portion
2 : trap drainage
3 : drain hole
4 : weir portion
5 : sump portion
6 : vent space
7 : partitioning wall
8 : notch

Claims

1. A water closet in which a flushing tank (B) is formed integral with a closet body (A) and comprising:

trap drainage (2) leading from an inlet (14) in a bowl portion (1) to a drain hole (3) in a side peripheral surface of the closet body; and

said trap drainage (2) having a sump portion (5) downstream of a weir portion (4)

characterized in that

a trap drainage portion (b) between the weir (4) and the sump (5) is gradually reduced

downwardly in cross-section such that there are no sudden projections into said drainage portion (b); and

a downwardly extending partition wall (7) projecting into the sump (5), said partition wall leaving a slight vent space (6) between the lower end of the partition wall (7) and a water surface level of the sump (5).

2. A water closet as in Claim 1 and wherein said partition wall (7) is formed with a notch (8).

3. A water closet as in Claim 1 or Claim 2 and wherein there is a water guide passage (12) leading from said flushing tank (B) to said inlet (14).

Patentansprüche

1. Wasserklosett bei dem ein Spültank (B) einstückig mit einem Klosettkörper (A) ausgebildet ist, umfassend:

einen Siphonabfluß (2), der von einem Einlaß (14) in einem Schüsselabschnitt (1) zu einer Abflußöffnung (3) in einer seitlichen Umfangsfläche des Klosettkörpers führt; und

wobei der Siphonabfluß (2) einen Sumpfabschnitt (5) stromabwärts eines Überlaufabschnitts (4) aufweist, dadurch **gekennzeichnet**, daß

ein Siphonabflußabschnitt (b) zwischen dem Überlaufabschnitt (4) und dem Sumpf (5) nach unten in seinem Querschnitt allmählich derart verringert ist, daß keine abrupten Vorsprünge in dem Abflußabschnitt (b) vorhanden sind; und

eine sich nach unten erstreckende Trennwand (7) in den Sumpf (5) vorsteht, wobei die Trennwand einen kleinen Entlüftungsraum (6) zwischen dem unteren Ende der Trennwand (7) und einer Wasseroberfläche des Sumpfes (5) läßt.

2. Wasserklosett nach Anspruch 1, dadurch **gekennzeichnet**, daß die Trennwand (7) mit einer Aussparung (8) versehen ist.

3. Wasserklosett nach Anspruch 1 oder 2, dadurch **gekennzeichnet**, daß ein Wasserführungskanal (12) von dem Spültank (B) zu dem Einlaß (14) führt.

Revendications

1. Water-closet dans lequel le réservoir de chasse (B) est moulé d'une seule pièce avec le corps de water-closet (A) et comportant :

une évacuation en forme de siphon (2) conduisant, depuis une entrée (14) prévue dans la portion formant cuvette (1), jusqu'à un trou d'évacuation (3) prévu dans une surface périphérique latérale du corps du water-closet ; et

ladite évacuation en forme de siphon (2) présentant une portion formant puisard (5) en aval d'une portion formant déversoir (4),

water-closet caractérisé

par le fait que la section droite de la portion (b) de l'évacuation en forme de siphon située entre le déversoir (4) et le puisard (5) diminue graduellement de façon qu'il n'y ait pas de saillie brusque dans ladite portion d'évacuation (b) ; et

par le fait qu'une paroi de cloisonnement (7), qui s'étend vers le bas, vienne en saillie dans le puisard (5), ladite paroi de cloisonnement laissant un faible espace d'évent (6) entre l'extrémité inférieure de la paroi de cloisonnement (7) et le niveau de la surface de l'eau du puisard (5).

2. Water-closet selon la revendication 1 et dans lequel ladite paroi de cloisonnement (7) comporte une encoche (8).

3. Water-closet selon la revendication 1 ou la revendication 2 dans lequel il y a un passage de guidage de l'eau (12) qui va, depuis ledit réservoir de chasse (B) jusqu'à ladite entrée (14).

FIG.1

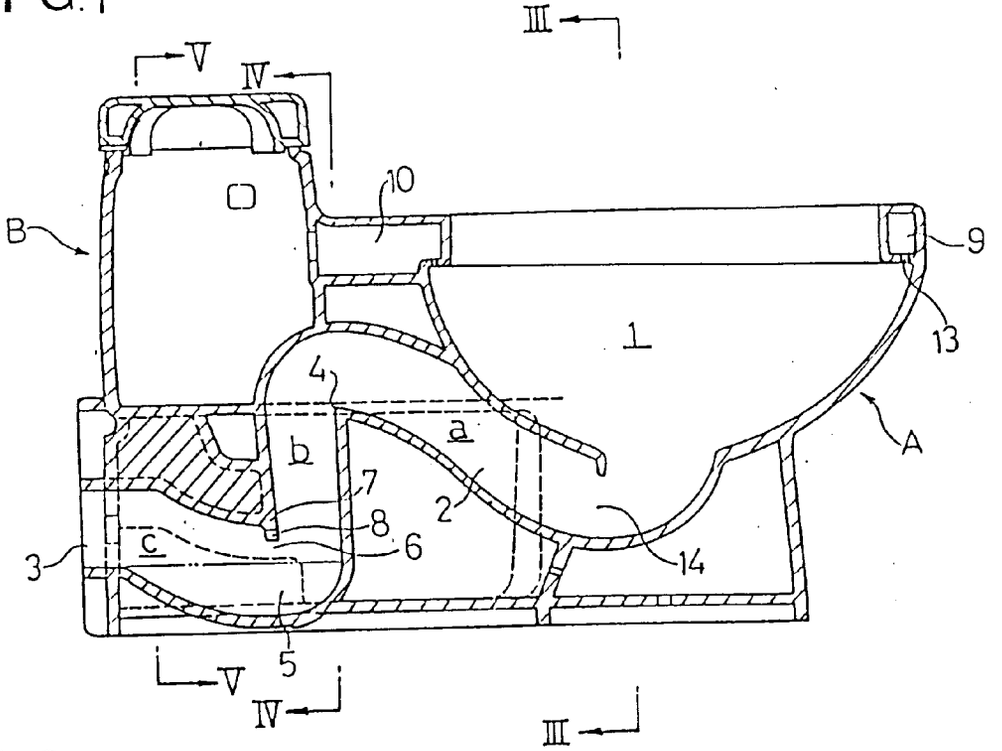

FIG.2

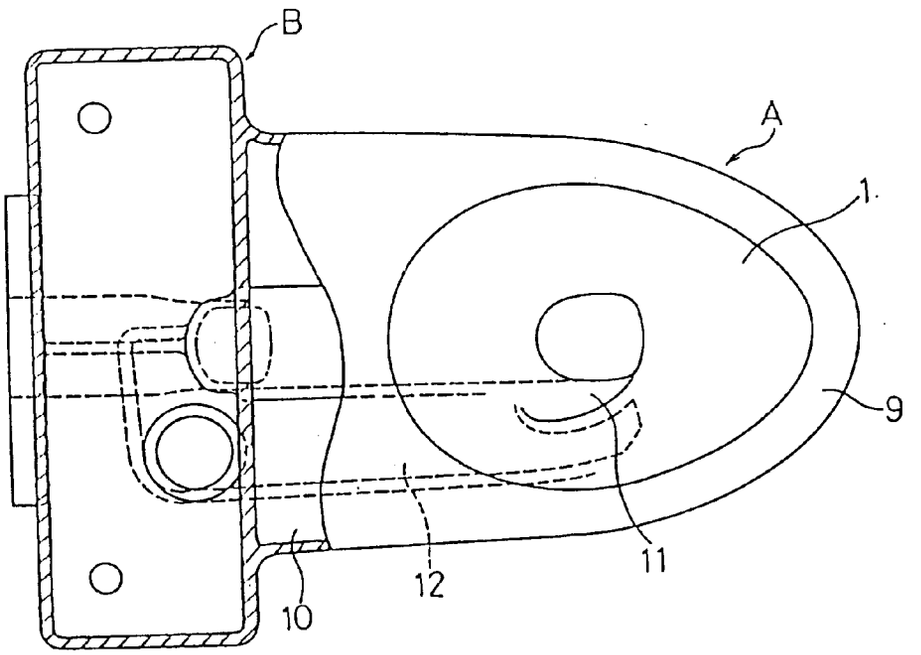

FIG.3

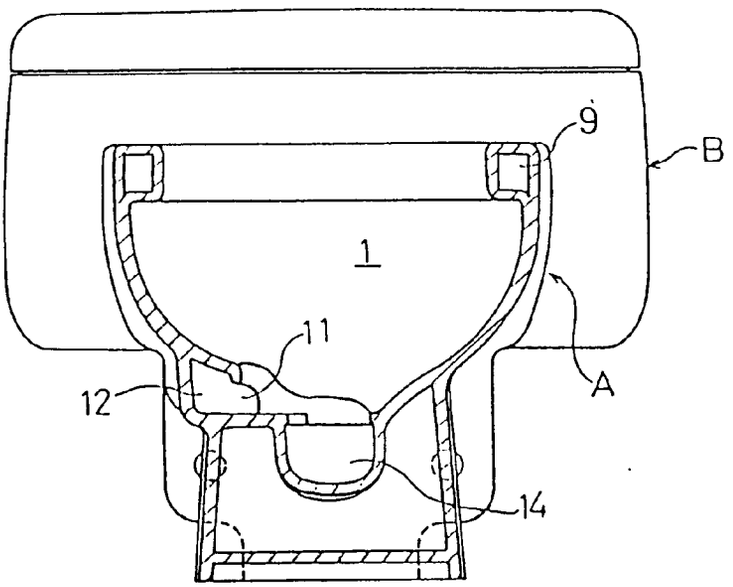

FIG.4

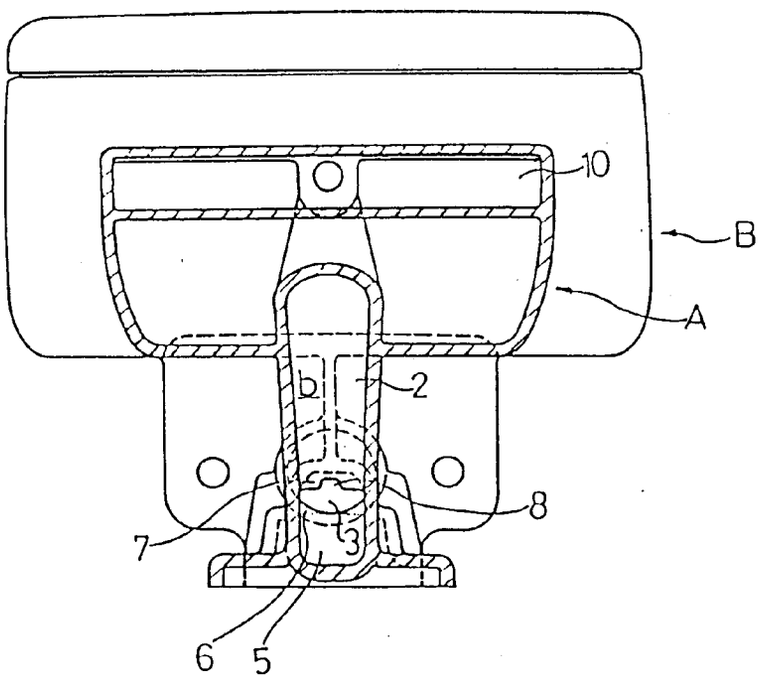

FIG. 5