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**DE-C- 0 239 980**  
**DE-C- 0 974 635**  
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**US-A- 1 409 613**

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## Description

The objective of this application requesting a patent for an invention consists of certain perfecting techniques introduced in the manufacture of such writing devices as ball point pens or other similar pens, which facilitate a continued control of the consumption of ink and the remaining ink which this writing device uses.

Today, as a point of reference concerning the status of this technique, we can mention that ink holders of ball point pens or other similar pens are manufactured using tubular metallic and opaque devices which always obstruct the view when you try to see how much ink has been used or how much ink remains which can be used. Transparent plastic devices are also made which present visual problems concerning the exhaustion or the remainder of the ink left in the writing pen, since generally leftover ink remains adhered to the walls where it is kept. In first place, you cannot control the remainder of the ink to be consumed and at the same time ink is wasted which undoubtedly can never be used.

Finally, it should be pointed out that when these devices do not show how much ink is left to be exhausted, any difficulty in the writing or an instantaneous stop, leads a person to the wrong conclusion concerning the amount of ink which has been drained out of the inkwell. This in turn generates a further expenditure as the writing device is discarded.

According to DE-C-974635 the ink font of a fountain pen consists of a transparent plastic material and contains window forming means. A holder tube is formed by injection moulding on the ink font, resulting in a holder tube containing windows for controlling ink exhaustion. This construction is disadvantageous since, as explained above, ink may adhere to the plastic walls of the windows and obstruct the view.

Accordingly it is the problem of the invention to provide writing devices which do not show the above disadvantages in ink exhaustion controlling.

This problem is solved with writing devices which permit controlling of ink exhaustion with several openings or passage windows near the point of writing indicating the level of load, whereby a certain quantity of a bright colored substance is incorporated at the free end of the ink load of the writing device, this substance has a lower density than the ink and is not miscible with the ink but remains in constant contact with the extreme end of the ink load and creates a common plane separating both.

Subject matter of the invention is further a transparent ink cartridge containing besides the ink a bright colored substance which is not miscible with the ink and has a lower density than the ink.

Consequently, the introduction of improvements in the manufacture of loading mechanisms or inkwells made for writing devices have been able to resolve all and each of the above mentioned difficulties which are those most commonly found when ball point pens today are used.

These perfecting techniques may be summarized in the following manner. In the first place, the loading ink cartridge which has usually been made for this purpose will contain in the upper open holding area or opening end, a substance with a lower density than the ink. This substance which has a very bright color does not mix itself with the ink. When both elements unite - that is to say, the ink used basically for writing and the bright colored substance - this action will show how much ink has been used and how much is left to be used.

When ink is exhausted slowly as the writing pen is used, the level of the ink will start descending and along with this ink the additional substance located at the end of the pen will also descend, because the depression created as the ink descends will indicate in the same way the status of the substance located on the other side which will be in contact with the free end of the ink. However, this substance will never mix with the ink, because a mixture of both materials - if both were able to mix - would contribute to the loss of an undoubtedly practical value achieved by the addition of this product, if the final area or the end of the ink and the beginning of the marking substance faded away.

In second place, this cartridge or ink well is encased in the body of the ball point pen, where very near the point one or more holes will be opened vertically having a passage, to allow partial observation of the ink well where the ink will act as in the same manner as if it were the fine tube of glass which contains the mercury in a thermometer, except that the ink descends and when the cartridge is filled all you will see is a dark color.

In order to present a detailed description of the invention, this description shall correspond to the figures attached at the end of this application. These figures are mere examples and without further limitations they represent a preference for accomplishing the objective.

Figure 1 represents the perspective of an amplified and detailed view amplified of the zone where the end of the ink and the added substance are joined.

Figure 2 shows the section where the ink and the substance of the other extreme unite.

Figure 3 represents successive phases in the exhaustion of a mounted ball point pen, where by means of side openings one may observe the successive descent of the ink.

Figure 1 shows a perspective view of the perfecting of the invention, consisting of placing a tube or well, preferably of an elongated shape (1) and made of transparent plastic material. This elongated element will have additional traditional parts and, outside the context of this invention, it will contain a cartridge of writing ink (2) which will be the one that will be used by the writing device.

In the free end of the ink, a non-mixable substance (3) will be added to the writing ink (2). This substance is so selected, that no different behavioral problems shall exist with respect to the ink. This additional substance (3) will be of a very bright color and shall readily indicate - without going into major extensive details - the approximate level of the ink that still has to be exhausted, since the separating surface (4) shall be quite visible from any appropriate distance.

This substance (3) which is made of a very bright color will be placed in a given amount, at 4 to 6 millimeters, next but not dependent of the ink well's diameter, since this loading longitude has been calculated as the most appropriate, and sufficient enough to be able to observe the condition of the ink in full detail and with no effort whatsoever. This longitude is not excessive. The manufacturer has not introduced it merely to achieve the shorter duration of the writing device, with the consequent savings of ink introduced therein.

Figure 2 represents a section of the inkwell or loading (1) to which the ink load (2) has been added plus the marking colored substance (3), that due to its bright color facilitates perfect visibility of the same and the line of separation (4) with the ink. Both devices, the ink (Fig. 2) as well as the superior product for marking (3) do not mix, defining between the two in a very noticeable way, the separation surface.

The contact edges of the marking device as well as those of the ink with the internal side walls of the containing well are shaped like a cavity. This shows the surface tension exerted over both products.

Figure 3 shows the inkwell of the ball point pen mounted over a body or exterior frame (10), having windows or openings (9) near the point of the ball point pen which despite the fact that there are three circular openings, their shape can adopt any optional form, that is to say they could be rectangular, square, elongated, etc. These windows will indicate the level of ink in the inkwell of the ball point pen. The effect of the ink as it passes through these openings will resemble a thermometer except that it will only be going downward. The other end of the descending load will be the one exercising control at all times over the remaining ink which has not been used. The bright colored substance incorporated at the end of the

ink load will facilitate to a great extent the observation through openings (9), allowing a view up to its inferior opening which will indicate that the load is at the minimum level of capacity.

## Claims

1. A writing device which permits monitoring of ink exhaustion with several openings (9) or passage windows (9) near the point of writing indicating the level of load, characterized in, that a certain quantity of a bright colored substance (3) is incorporated at the free end of the ink load (1) of the writing device, this substance has a lower density than the ink and is not miscible with the ink (2) but remains in constant contact with the extreme end of the ink load and creates a common plane (4) separating both, whereby said common plane defines the level of load.
2. A writing device according to claim 1, characterized in that independently from the diameter of the ink load, the bright colored substance (3) incorporated at the free end of the ink load, preferably has a length between a minimum of 4 millimeters and a maximum of 6 millimeters.
3. Ink cartridge for monitoring of ink exhaustion in a writing device according to claims 1 and 2, containing besides the ink a bright colored substance which has a lower density than the ink and is not miscible with the ink but remains in constant contact with the extreme end of the ink load.

## Patentansprüche

1. Schreibvorrichtung, welche die Überwachung der Erschöpfung an Tinte erlaubt, mit mehreren Öffnungen (9) oder Passagefenstern (9) nahe dem Schreibpunkt, die den Füllungsstand anzeigen, dadurch gekennzeichnet, daß eine bestimmte Menge einer hell gefärbten Substanz (3) am freien Ende der Tintenfüllung (1) der Schreibvorrichtung inkorporiert wird, wobei diese Substanz eine niedrigere Dichte als die Tinte hat und mit der Tinte (2) nicht mischbar ist, jedoch in ständigem Kontakt mit dem äußeren Ende der Tintenfüllung verbleibt und eine die beiden trennende gemeinsame Ebene (4) erzeugt, wobei die gemeinsame Ebene den Füllstand definiert.
2. Schreibvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß unabhängig vom Durchmesser der Tintenfüllung die hell gefärbte

Substanz (3), welche am freien Ende der Tintenfüllung inkorporiert wird, vorzugsweise eine Länge zwischen einem Minimum von 4 mm und einem Maximum von 6 Millimetern aufweist.

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3. Tintenpatrone zur Überwachung der Tintenerschöpfung in einer Schreibvorrichtung nach Ansprüchen 1 und 2, welche neben der Tinte eine hell gefärbte Substanz von niedrigerer Dichte als die Tinte enthält und nicht mit der Tinte mischbar ist, jedoch in konstantem Kontakt mit dem äußeren Ende der Tintenfüllung verbleibt.

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### Revendications

1. Un dispositif d'écriture permettant le contrôle de l'épuisement de l'encre comportant près du point d'écriture plusieurs ouvertures (9) ou fenêtres de passage (9) indiquant le niveau de remplissage de la charge d'encre, caractérisé en ce qu'une certaine quantité d'une substance de couleur vive (3) est incorporée à l'extrémité libre de la charge d'encre (1) du dispositif d'écriture, cette substance ayant une masse spécifique inférieure à celle de l'encre et n'étant pas miscible avec l'encre (2) mais restant en contact constant avec l'extrémité de l'encre éloignée de la pointe d'écriture et créant un plan commun (4) les séparant, caractérisé en ce que ledit plan commun définit le niveau de charge.
2. Un dispositif d'écriture suivant la revendication 1, caractérisé en ce que, indépendamment du diamètre de la charge d'encre, la substance de couleur vive (3) incorporée à l'extrémité libre de l'encre contenue dans la charge d'encre a de préférence une longueur comprise entre un minimum de 4 millimètres et un maximum de 6 millimètres.
3. Une cartouche d'encre pour le contrôle de l'épuisement de l'encre contenue dans des dispositifs d'écriture suivant les revendications 1 et 2, contenant en plus de l'encre une substance de couleur vive qui a une masse spécifique inférieure à celle de l'encre et qui n'est pas miscible avec l'encre, mais qui reste en contact constant avec l'extrémité de la charge d'encre.

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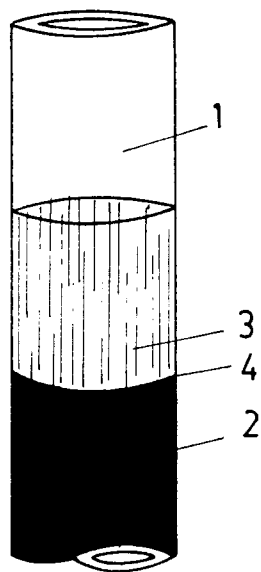


FIG. 1

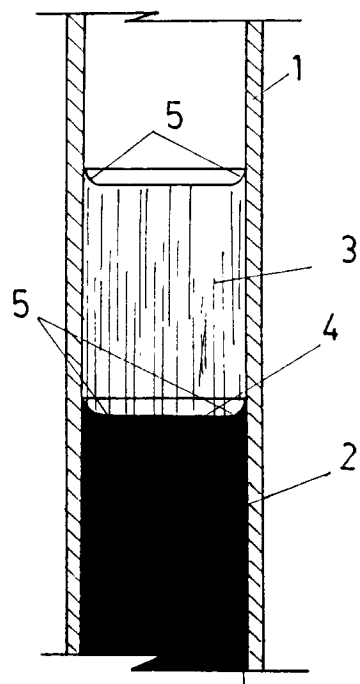


FIG. 2

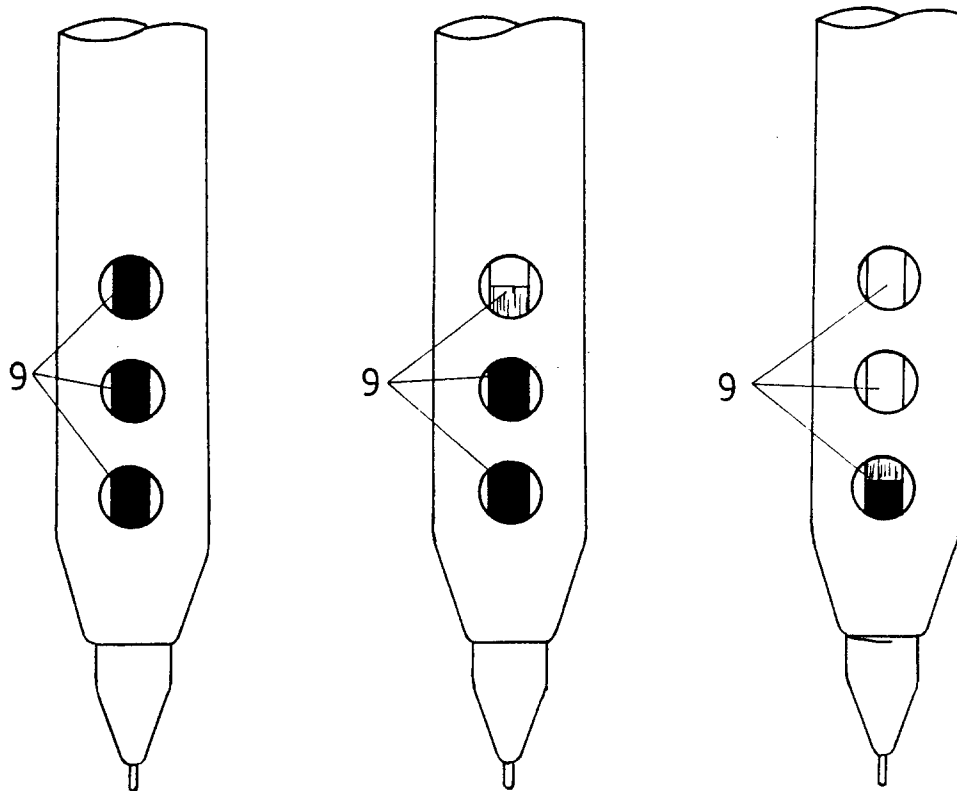


FIG. 3