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(71) Applicant: **TOMBOW PENCIL CO., LTD.**
6-10-12, Toshima, Kita-ku
Tokyo 114(JP)

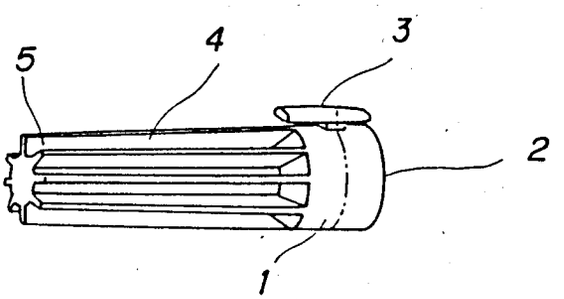
(72) Inventor: **Wakai, Takeshi, c/o Tombow Pencil Co.,Ltd.**
6-10-12 Toshima
Kita-ku, Tokyo(JP)
Inventor: **Nagai, Masahiko, c/o Ogawa Kakoh Co.,Ltd.**
6-12-19 Toshima
Kita-ku, Tokyo(JP)

(74) Representative: **Schmidt, Horst, Dr.**
Siegfriedstrasse 8
W-8000 München 40(DE)

(54) Safety pen cap.

(57) An integrally formed safety pen cap comprises a cap body with closed and open axial ends, and further at least one groove (4) extending on the outer circumference of the cap body (1) in the axial direction from the edge at the closed end towards an intermediate position of the cap body (1), and at least one rib (3) projecting from the cap body (1) and axially extending from a position above the intermediate end of said grooves (4) up to the edge at the open end (2) of the cap body.

Fig. 8



EP 0 481 479 A1

The invention relates to a safety pen cap, i.e. a cap for a writing instrument, which is adaped to avoid suffocation in case the cap is accidentally swallowed and lodged in a person's windpipe.

So far caps exist (DE 3817248 C1, GB 2233607, JP 1-139595 U, JP 1-169385 U) which prevent evaporation of the ink of the pen by covering its pointed end in an air-tight manner when the pen is not in use. To assure a ventilation in case the cap is accidentally swallowed, the cap comprises an outer cylindrical portion disposed around an inner cylindrical cap-like portion by which a space is formed between the inner and outer portions, which enables an air flow in the longitudinal direction of the cap. However, complicate molds are generally necessary for forming these caps which therefore are comparatively expensive. Moreover the space between the outer and inner portions can easily be clogged by foreign material. There has also been proposed a cap (EP 330877 A2) having a number of vertical grooves provided side by side in the outer circumference and connected at its inner ends to an inside portion of the cap thus providing a ventilation path in the longitudinal direction of the cap which entends partly outside and partly inside the cap. An air passage of this type causes significant restrictions as to the use of the cap as well as to its production and design. In addition there are disadvantages with regard of the function of the cap to prevent evaporation of the ink of the pen.

The invention serves to essentially avoid the drawbacks of the known safety pen caps. In particular the invention is an improvement of a cap of a type which is known from applicant's EP 433532 A1.

An object of the invention therefore is to provide a safety pen cap which can easily be easily formed in an integral manner with low cost, and in spite of a satisfactory air-tightening function is suitable to prevent in a reliable manner suffocation in case the cap is swallowed.

The cap according to the invention comprises a cap body with closed and open axial ends, and further including at least one groove extending on the outer circumference of the cap body in the axial direction from the edge at the closed end towards an intermediate position of the cap body, and at least one rib projecting from the cap body and axially extending from a position near above the intermediate end of said groove up to the edge at the open end of the cap body.

The cap can be formed in an integral manner by using a metallic mold having a simple design. Even if the cap is accidentally swallowed, an air passage is left to allow flow of air along the axial direction of the cap in all situations, since the cap comprises one or more grooves and ribs in which one end of each rib is extended on the grooves while the other end of the rib terminates at the open end edge of the cap. Further since a connecting or supporting web of the rib is disposed at a location away from a sealing part of the cap , the sealing or tightening part will not be affected during the formation of the cap by an incomplete formation of the rib, threreby the air-tightening function of the cap is perfectly assured.

The invention will now be described in detail hereafter with reference to the drawings, in which

- Fig. 1 shows a first embodiment of the invention,
- Fig. 2 is a right side view,
- Fig. 3 is a left side view,
- Fig. 4 is a cross-sectional view in the direction A-A of fig. 1,
- Fig. 5 shows a second embodiment of the invention,
- Fig. 6 is a right side view,
- Fig. 7 is a left side view,
- Fig. 8 shows a third embodiment of the invention,
- Fig. 9 is a sectional view in the longitudinal direction,
- Fig. 10 is view similar to Fig. 9 with a pen inserted in the cap,
- Fig. 11 is a sectional view in the longitudinal direction of a modification of the third embodiment,
- Fig. 12 is a fragmentary cross-sectional view showing a preferred arrangement of rib-like partition walls , and
- Fig. 13 is a fragmentary cross-sectional view showing another arrangement of rib-like partition walls.

In the drawings same reference numbers are used throughout to indicate same or similar parts.

In the embodiment according to Fig. 1 to 4 reference number 1 indicates a cap body having axial ends, namely an open end 2 and an opposite closed end. A top portion of a pen (see fig. 10) can be inserted from the open end 2 into the cap to cover the pointed end of the pen in an air-tight manner. Reference number 3 indicates a pair of ribs radially projecting from the outer circumference of the cap body 1 on diametral portions thereof and each extending from an intermediate position of the cap body 1 to the open end 2 thereof in the longitudinal direction. While a pair of ribs 3 is shown, also less or more than two ribs 3 could be provided. The end of each rib 3 remote from the open end 2 of the cap extends on a pair of spaced parallel grooves 4 which are provided in the cap body 1 and extend in the longitudinal direction from the closed end of the cap up to nearly a location halfway the length of the cap. Reference number 5 indicates a surface of the cap

body between the grooves 4.

Since the first embodiment is constructed as mentioned above, it can be easily formed in an integral manner by means of an uncomplicated metallic mold. In case the cap is accidentally swallowed, in connection with the windpipe of a person an air passage extending in the axial direction of the cap is formed by the grooves 4 and the ribs 3. By proper dimensioning the grooves and ribs a sufficient cross section of the air passage to avoid suffocation can be assured.

In the embodiment of the invention according to fig. 5 to 7 the ends of the grooves 4 of the pen according to the first embodiment are communicated with a circular groove 4' provided in the cap body 1 at about a central portion thereof, i.e. a portion of the pen into which either of the grooves 4 and ribs 3 extend. Other details of this embodiment correspond to that of the first embodiment.

The second embodiment assures an air flow along the surface of the cap body 1 even if one or more of the longitudinal grooves 4 should become clogged in that the air can still flow from an open groove 4 along the circular groove 4' to the space beneath the ribs 3.

Fig. 8 to 13 show a third embodiment of the invention. On a cap body 1 a number of thin, rib-like partition walls or fins 5 is integrally formed between which comparatively long longitudinal grooves 4 are defined. On an essentially cylindrical sealing portion 6 of the cap body 1 disposed adjacent the open end 2 of the cap and having an outer diameter essentially corresponding to that of the partition walls 5 a longitudinally extending rib 3 is provided which is supported by the cap body 1 by means of a short radial web portion 8. The dimensions of the web portion 8 in the circumferential and longitudinal directions is less than that of the rib 3. Thus a space is left between the underside of the rib and the surface of the cap body 1. The rib 3 extends along the cylindrical cap portion 6 from nearly the open end 2 of the cap body 1 to a position above the inner ends of the grooves 4. Reference number 7 indicates circumferentially spaced protrusions on the inner surface of the cylindrical cap portion 6 to engage an outer portion of a pen when it is inserted into the cap for aligning and sealing its pointed end (see fig. 10).

Fig. 11 is a modification of the preceding embodiment in that the web-like connecting portion 8 is dislocated to a location near the partition walls 5. Further the axial positions of the protrusions 7 and an annular bead adadpted to engage an annular recess of the pen are interchanged, namely the annular bead 6 is disposed near the open end 2 of the cap while it is provided near the grooved portion of the cap in the embodiment according to fig. 8 to 10.

Fig. 12 and 13 are cross-sectional views of different typs of arrangements of the rib-like partition walls 5. Fig. 12 shows an arrangement where a number of partition walls 5 is equally spaced along the circumference of the cap body 1. Fig. 13 shows an arrangement where a pair of partition walls 5 is provided on diametral portions of the cap body 1. Reference number 4 indicates the grooves defined between the rib-like partition walls 5.

A cap according to the third embodiment can easily be formed by moving a metallic mold to the right and left side from the dotted line of fig. 8, thereby the metallic mold can have a simple design. Preferably, the rib 3 is connected with the cap body 1 by means of a connecting portion 8 which is disposed on the outside at a suitable distance from the sealing protrusion 6 on the inside of the cap, thereby the air-tight or sealing effect of this part cannot be affected by defects as a result of an incomplete formation of the rib 3 during molding. Thus the air-tightening function of the cap at the pointed end of the pen is perfectly assured. The cap according to the embodiments shown in fig. 8 to 13 further prevents suffocation in case the cap is accidentally swallowed in a reliable manner.

As mentioned above, the invention enables the formation of caps in an integral and easy manner, avoids defects at the air-tightening part caused by incomplete formations, lowers the cost, and enables to make a plan on the length of a groove and a rib respectively and at one's will thus allows a plan with wide possibilities. Further it has outstanding effects on preventing suffocation caused by swallowing the cap accidentally.

Claims

1. An integrally formed safety pen cap having a cap body with closed and open axial ends, characterized by at least one groove (4) extending on the outer circumference of the cap body (1) in the axial direction from the edge at the closed end towards an intermediate position of the cap body, and at least one rib (3) projecting from the cap body (1) and axially extending from a position above the intermediate end of said groove (4) up to the edge at the open end (2) of the cap body.

2. A safety pen cap according to claim 1, in which said rib (3) is connected to the cap body (1) in a manner to prevent molding effects on the formation of a tightening or sealing portion (6).

3. A safety pen cap according to claim 2, in which said sealing portion (6) comprises an annular bead formed on the inner surface for

engaging an annular recess formed in a portion of the pen.

4. A safety pen cap according to one of the preceding claims, in which said groove (4) is defined between at least a pair of rib-like partition walls (5) formed on the outer circumference of the cap body (1).

5. A safety pen cap according to one of the preceding claims, in which said rib (3) being spaced from and connected to the outer circumference of the sealing portion (6) of said cap body (1) by means of a connecting portion (8).

Fig. 1

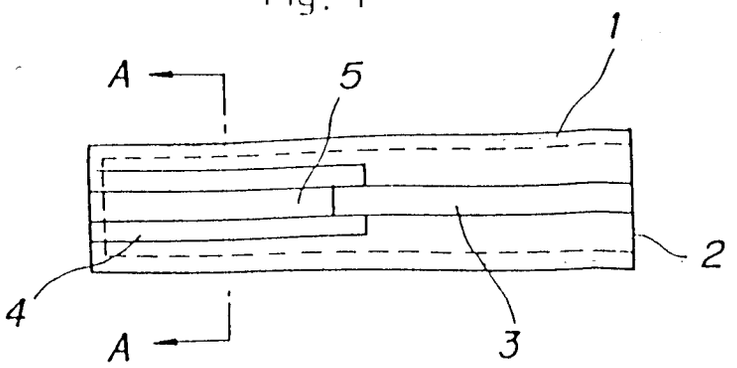


Fig. 2

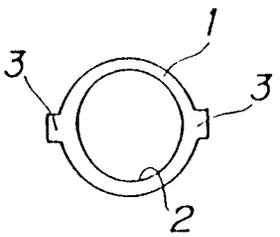


Fig. 3

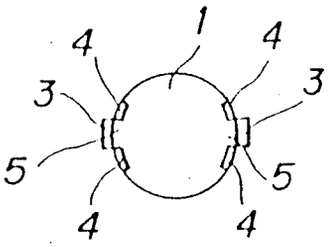


Fig. 4

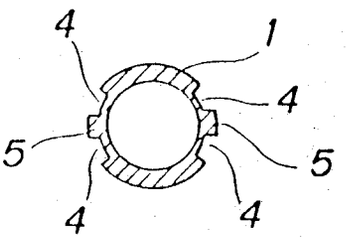


Fig. 5

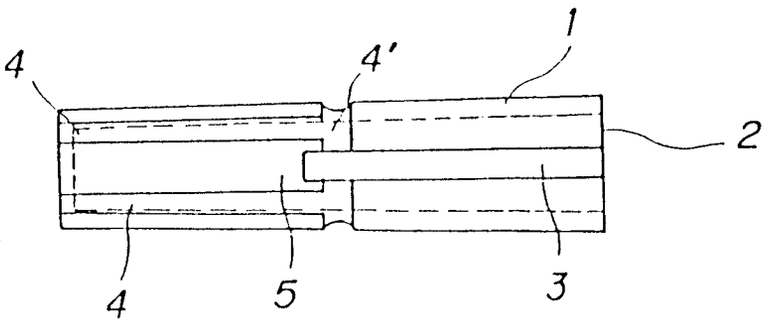


Fig. 6

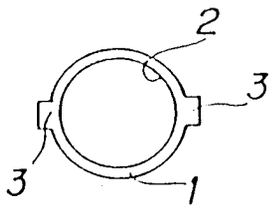


Fig. 7

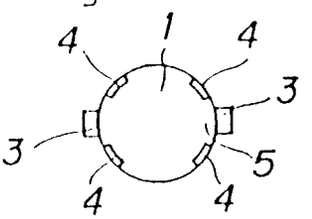


Fig. 8

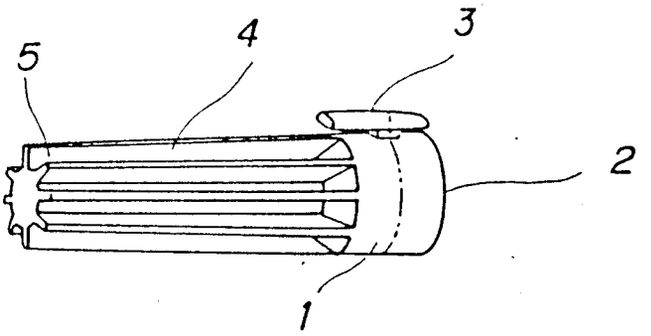


Fig. 9

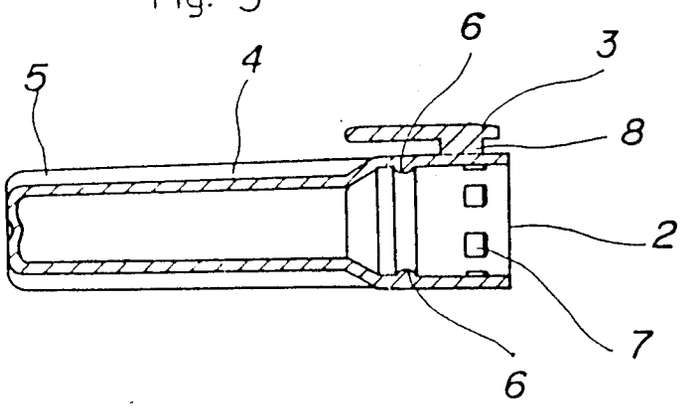


Fig. 10

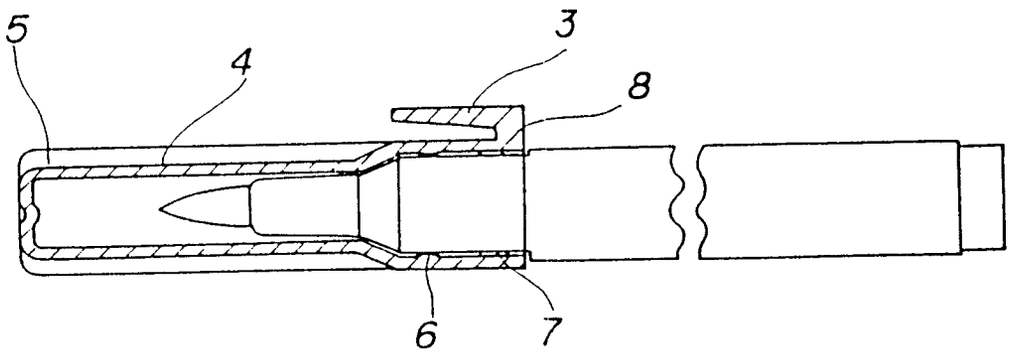


Fig. 11

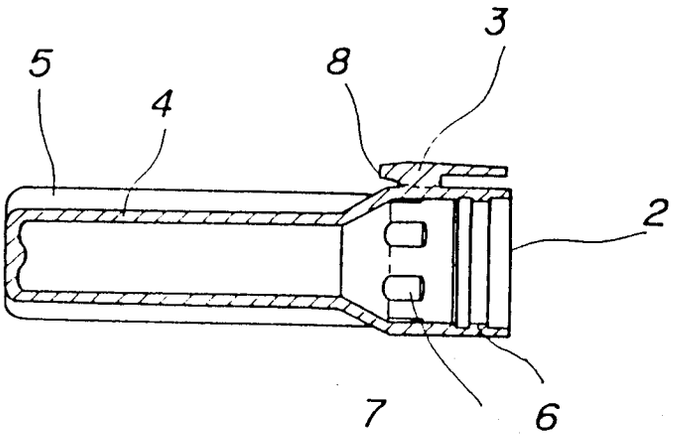


Fig. 12

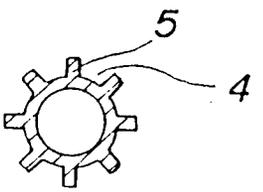
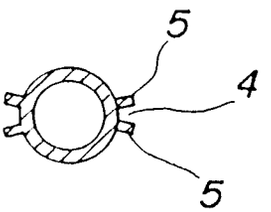


Fig. 13



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EUROPEAN SEARCH REPORT

Application Number

EP 91 11 7739

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
P,X	EP-A-0 433 532 (TOMBOW PENCIL) * column 8, line 58 - column 10, line 23; figures 27-34 * *	1,4,5	B 43 K 9/00
Y	DE-U-8 907 626 (STAEDLER) * page 3, paragraph 5 - page 4, last paragraph; figures 3-6; table * *	1,4,5	
D,Y	EP-A-0 330 877 (DOBELL) * abstract; figures 1-3 * *	1,4,5	
A	BE-A-906 095 (AERMI INTERNATIONAL) * page 2, paragraph 10 - page 3, paragraph 1; figure 1 * *	2,3,5	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 43 K

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	22 January 92	PERNEY Y.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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