# PATENT SPECIFICATION 1,017,343

DRAWINGS ATTACHED.

1,017,343

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**Int. Cl.**:—**B 43 c** //A 61 j, B 67 b.


## COMPLETE SPECIFICATION.

## Improvements in or relating to the Manufacture of Containers of Elongated Shape.

We, AURORA SOCIETA per AZIONI an Italian Body Corporate, of 1 Via Arcivescovado, Turin, Italy, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to cartridges of synthetic material for liquids particularly for ink, utilized in fountain pens or the like.

Known cartridges of this kind normally comprise a casing of synthetic material, at the upper end of which is provided a membrane made of the same material of the casing which has to be perforated by means of a suitable piercing means of the feeder assembly of the fountain pen, while the other end of the cartridge is provided with a bottom wall, which is also made of the same material of the casing.

The membrane which is intended to be perforated in the cartridge of the above kind, is normally flat and its thickness is less than that of the casing of the bottom wall, so that it can be perforated by exerting a moderate piercing force thereon.

The cartridges of the above kind are normally manufactured by an injection moulding technique on semi-automatic or fully automatic machines, by utilizing a plurality of dies provided with a plurality of impressions, and suffer from the disadvantage that, due to the particular moulding process described, the casing and the membrane or the bottom wall thereof may be of non-uniform thickness and, in some cases, may even be perforated.

This disadvantage is particularly increased in containers or in cartridges having a high length/diameter ratio, due to the tendency of the inner mandrel or core of the die to become flexed.

According to the present invention there is provided a cartridge of synthetic material for liquids, comprising a casing closed at one end by a perforable membrane, wherein the perforable membrane has the form of a cone whose apex lies on the axis of the cartridge and is directed towards the interior of the cartridge.

This form of membrane eliminates the tendency of the inner mandrel or core to become flexed under the effect of the pressures acting on the latter upon injection of the material. Said form of the cartridges membrane further affords the advantage of an exact centering of the piercing point on the membrane aforesaid upon introduction of the cartridge in the fountain pen, or other device, in which the cartridge is utilized.

A specific embodiment of the invention will now be described by way of example, with reference to the accompanying drawing, in which:—

Figure 1 shows a longitudinal section through a cartridge embodying to the invention, and

Figure 2 diagrammatically illustrates the moulding operation making evident the advantage afforded by the conical membrane.

With reference to the drawings, the cartridge comprises a cylindrical casing 1 of thermoplastic material having an end portion $1^1$ of reduced diameter, which is closed by a membrane 2 which is perforated at the moment of the use, and a bottom wall 3. As can be seen from the drawing, said membrane is in the form of a cone whose apex lies on the axis of the cartridge and is directed towards the interior of the latter.

Reference will now be made to Figure 2,


[*Price* ...

which diagrammatically illustrates the injection moulding process for producing a cartridge provided with a membrane as aforesaid, and whose casing has been illustrated as having a cylindrical shape, for better simplicity.

Fluid plastic material flows in through an injection orifice 4 and fills the cavity of the die, defined by a matrix die 5 and an inner mandrel or core 6. Said core 6 is fixed at one end in one plate of the die, while the other end thereof is free and therefore it can be flexed. The material under pressure, which flows in through the injection orifice 4, is able to exert on the core 6 a pressure whose resultant can have any direction whatever and, therefore, it may tend to flex said core. Further, during moulding, the core 6 may already be mis-centered with respect to the matrix die 5, due to errors made while assembling the die. This flexion or bending of the mandrel which is produced in the die during moulding, gives rise to a corresponding defect of centering in the pieces manufactured, with consequent differences of wall thickness.

The particular configuration of the membrane according to the invention eliminates this difficulty since the reversed-cone shape of said membrane and the injection of the moulding material through the orifice 4 at the apex of the cone, will determine the selfcentering of the core 6. The membrane will be formed between the tapered cavity in the end of the core 6 and the conical upper portion of the die and is very thin, so that no side displacements of the core 6 will be possible without mutual contact, on one side, of two generating lines of the cones defining said membrane. However, since injection takes place at the apex of the cone, this contact is prevented in as much as the injected material will tend to become uniformly distributed between the two cones thereby causing detachment thereof.

This obviously, would not be the case if the membrane, instead of being conical, were of flat shape, as in the known cartridges, since in this case the mandrel could become flexed without obstructing the flow of material in the membrane region.

Specification No. 24203/62 1,017,342 from which this application is divided, claims a cartridge of synthetic material having one or more longitudinal capillary channels.

WHAT WE CLAIM IS:—

1. A cartridge of synthetic material for liquids, comprising a casing closed at one end by a perforable membrane, wherein the perforable membrane has the form of a cone whose apex lies on the axis of the cartridge and is directed towards the interior of the cartridge.

2. A process for the manufacture of a cartridge as claimed in claim 1, wherein injection of a moulding material takes place at the apex of the cone formed by said membrane.

3. A cartridge of synthetic material for liquids, substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

4. A process for the manufacture of a cartridge substantially as hereinbefore described with reference to the accompanying drawing.

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1017343 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

**Fig.1.**

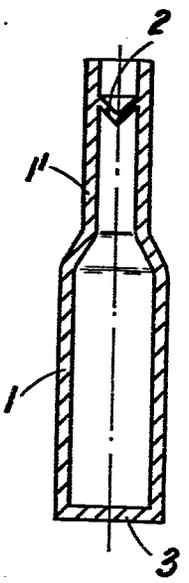


**Fig. 2.**