(57) Abrégé/Abstract:
The invention relates to a multicomponent cartridge with a container (1) having chambers (2, 3) for the reception of different fluid components, a mixer element (8) fixedly arranged at the container (1) for the mixing of the components and a dispensing tube (5).
(57) **Abstract (continued):**

which can be placed onto the mixer element (8) and which can be connected to the container (1) for the dispensing of the components. To permit a simple and secure placing of the dispensing tube, the mixer element (8) is configured as a guide element for the axial displacement of the dispensing tube (5).
Abstract

The invention relates to a multicomponent cartridge with a container (1) having chambers (2, 3) for the reception of different fluid components, a mixer element (8) fixedly arranged at the container (1) for the mixing of the components and a dispensing tube (5) which can be placed onto the mixer element (8) and which can be connected to the container (1) for the dispensing of the components. To permit a simple and secure placing of the dispensing tube, the mixer element (8) is configured as a guide element for the axial displacement of the dispensing tube (5).

(Fig. 4)
A multicomponent cartridge

The invention relates to a multicomponent cartridge.

DE 102 54 409 A1 shows an initially named multicomponent cartridge. The apparatus there for the mixing and dispensing of multicomponent products has a container with two chambers for two different flowable components, for example for dental purposes. To be able to mix the components prior to dispensing, a mixing coil is arranged at a cylindrical projection at one end of the chambers. This mixing coil is encompassed by a curved outlet tube arranged at a cap. The cap is rotatably placed onto a cylindrical projection of the chambers and can be rotated such that the curved outlet pipe can be rotated in the direction desired for the dispensing of the components mixed in the outlet tube. For this purpose, the mixing coil is made flexible and curves in each case in the direction of the outlet tube. In the supply condition of the apparatus, the cap is in the closed state in which it closes the outlet openings of the chambers. To be able to dispense the components contained in the chambers, the components are pressed out by means of a piston, with the chamber moving from the closed position into an open position by the pressure of the components alone. This admittedly has the advantage that the dispensing tube can be brought into a suitable dispensing position by rotation, e.g. to apply dental material to or into the teeth of a patient. However, the installation of the cap is very difficult since the flexible mixing coil makes the fast and simple placing on of the cap with the dispensing tube difficult. For instance, the sensitive, flexible mixing structure would have to be carefully introduced into the dispensing tube,
with it simultaneously being necessary to watch the correct seat of the cap on the cylindrical projection. The displacement of the cap between the open and the closed position also contains the risk of the tilting of the cap and of damage to the mixing coil.

To simplify the placing of a dispensing tube onto a multicomponent cartridge, dispensing tubes provided with special coupling devices have been proposed in the prior art which can also be placed onto the chambers at a later time. DE 20 2006 004 738 U1 thus shows, for example, an apparatus for the mixing of two fluids in which two syringe parts can be reliably fastened to one another by means of an adapter element. A grommet with a mixing element arranged therein can be arranged at the side of the adapter element remote from the syringe parts, with them being connected by a coupling element similar to a bayonet fastening. A further placeable dispensing structure with a mixer structure located therein is shown by EP 0 319 135 A2. Security against rotation is provided there by a dividing wall which is arranged at the syringe part and which engages in a corresponding slot at the dispensing tube. To prevent damage to the mixer element, it is already arranged in the dispensing tube before the dispensing tube is put on. In none of the known apparatuses, however, is it ensured in a simple manner that the dispensing tube can be arranged cleanly on the syringe part without damaging the mixer element when being placed on. There is also the risk that the dispensing tube is not placed cleanly on the syringe part so that when the syringes are pressed out the components can escape at the side at the connection points between the syringe parts and the dispensing tube.

According to one embodiment of the invention, there is provided a multicomponent cartridge of the initially named kind which allows a simple and secure placing of a dispensing tube onto a container of the
multicomponent cartridge as well as a moving to a fro between an open position and a closed position of the multicomponent cartridge.

The placing on and displacement of the dispensing tube at the container of the multicomponent cartridge can be advantageously enabled in the multicomponent cartridge in accordance with the invention in that the mixer element is configured as a guide element for the axial displacement of the dispensing tube.

To improve the displaceable guidance of the dispensing tube, the outer contour of the mixer element and the inner contour of the dispensing tube are matched to one another in an advantageous manner. Furthermore, in a particularly advantageous embodiment, the outer contour of the mixer element and the inner contour of the dispensing tube are matched to one another such that the dispensing tube can only be placed onto the mixer element in a predetermined position. In production, the dispensing tube can then no longer be placed on incorrectly, whereby a faulty placing of the dispensing tube on the mixer element is precluded. This can be achieved particularly easily in that the outer contour of the mixer element and the inner contour of the dispensing tube are rectangular or elliptical.

In this connection, a reliable guidance of the dispensing tube can additionally be made possible if the container has at its end at the mixer side a dispensing region of rectangular or elliptical shape which is engaged around by a correspondingly shaped step region of the dispensing tube.
To ensure a fixing of the dispensing tube in an open position and/or in a closed position of the dispensing tube holding elements, in particular latch noses and corresponding latch grooves, are provided at the container and/or at the dispensing tube in an advantageous embodiment of the invention. The components can hereby be dispensed without problem, on the one hand, and the chambers can be closed in a sealing manner, on the other hand, whereby a drying out or premature hardening of the components present in the chambers can be avoided. Dispensing openings of the chambers can particularly advantageously be sealingly closed by corresponding sealing elements arranged at the dispensing tube. In addition, the latch noses and latch grooves help the user to ensure that the dispensing tube is located in the correct position.

To avoid any accidental pulling of the dispensing tube off the container and to nevertheless permit a proper dispensing of the components from the chambers into the dispensing tube, securing elements are provided at the container and/or at the dispensing tube.

In an embodiment which is advantageous from a technical production aspect, the mixer element consists of a stable-shape material, so that the mixer element and the container are advantageously shaped in one single piece.

In accordance with another embodiment of the invention, there is provided a multicomponent cartridge comprising a container having a plurality of chambers for the reception of different fluid components; a mixer element fixedly arranged on said container in communication with said chambers for receiving and mixing of the components from said chambers therein; and a dispensing tube mounted on said container in non-rotatable manner about said mixer element for directing and dispensing the mixture of the components therefrom, said dispensing tube being guided on said mixer element for axial displacement of said dispensing tube relative to said mixer element without rotation thereto.

Further special features and advantages of the invention result from the following description of a preferred embodiment with reference to the drawings. There are shown

Fig. 1 a three-dimensional view of a multicomponent cartridge with a discharge tube placed on in a closed position;
Fig. 2  a three-dimensional view of a section of the multicomponent cartridge of Fig. 1 without a dispensing tube;

Fig. 3  a cross-section through the end of a container of the multicomponent cartridge of Fig. 2 at the dispensing side without a dispensing tube;

Fig. 4  the cross-section of Fig. 3 with a dispensing tube in an open position;

Fig. 5  a detailed view of the upper end of the container of Fig. 4;

Fig. 6  a three-dimensional view corresponding to the detail of Fig. 5;

Fig. 7  a schematic view of the upper end of the container with a dispensing tube placed on in the open position;

Fig. 8  the representation of Fig. 7 with the discharge tube in the closed position.

The multicomponent cartridge configured as a dual syringe in Fig. 1 has a container 1 which has two substantially cylindrical chambers 2, 3 which are fixedly connected to one another for the reception of different components. The components are here the two components of a two-component adhesive which may only be mixed with one another before the application onto the articles to be glued. However, other components can also be stored in the chambers, for example for dental applications.
To be able to press the components out of the chambers 2, 3, the multicomponent cartridge has, as customary with dual syringes of this type, an expulsion plunger 4 which can be pressed from the end at the bottom in Fig. 1 towards the other end of the multicomponent cartridge. A dispensing tube 5 is arranged at the other end of the chambers 2, 3 at the dispensing side. The dispensing tube 5 has a substantially square cross-section and a dispensing opening 6 for the dispensing of the mixed components. This is held in a closed position shown in Fig. 1 by correspondingly configured securing elements 7, 7', with the operation of the securing element 7, 7' being explained in detail later.

As can be seen from Figs. 2, 3, in which the end of the container 1 at the dispensing side without a dispensing tube 5 is shown, a mixer element 8 equipped with numerous deflection elements is provided at a substantially elliptically shaped dispensing region 9 of the container 1. The dispensing region 9 extends the chambers 2, 3 in passage shape to form dispensing openings 2',3' towards its top through which the components can be dispensed from the chambers 2, 3 into the mixing space 10, 10' formed by the dispensing tube 5 placed on when the dispensing tube 5 is in the open position shown in Fig. 4.

As can be recognized particularly easily in Fig. 5, the components can flow into the substantially elliptical mixing space 10 by pressing in the expulsion plunger 4 towards the dispensing side of the container 1. Due to the pressure onto the components, they flow on through the mixer element 8 and the dispensing tube 5 towards the dispensing opening 6, with them being mixed uniformly and efficiently in the mixer element 8.

To hold the dispensing tube 5 securely in the open position shown in Figures 4 to 7, the discharge tube 5 has a shoulder region 11 at its end at
the chamber side which is shaped correspondingly to the elliptically shaped dispensing region 9 of the container 1 and which in particular permits a secure guidance of the dispensing tube 5 from the open position into the closed position and back in cooperation with elliptical peripheral projections 9', 9". To prevent the dispensing tube 5 from being accidentally pulled off the container 1, e.g. when the dispensing tube 5 is opened, the security elements 7, 7' have latch noses 12, 12' at their ends at the dispensing side, said latch noses being able to be pressed outwardly on the placing on of the dispensing tube 5 due to the flexibly configured securing elements 7, 7' and the chamfered ends of the shoulder region 11 at the chamber side. After the placing on of the dispensing tube 5, the latch noses 12, 12' then engage over the substantially horizontal surfaces of the shoulder region 11 and thus prevent its being pulled off.

To hold the dispensing tube 5 in the open position, holding elements in the form of latch projections 13, 13' are provided at the securing elements 7, 7' and engage into corresponding latch grooves 14, 14' at the dispensing tube 5, as can be recognized particularly easily in Fig. 7. To also fix the dispensing tube 5 in this position in the closed position shown in Fig. 8, the shoulder region 11 of the dispensing tube 5 has additional latch grooves 15, 15' which in turn engage into the latch projections 13 arranged at the securing elements 7, 7'.

In order to be able to sealingly close the dispensing openings 2', 3' in the closed position of the dispensing tube 5, the inner side of the shoulder region 11 has two substantially ring-shaped closing stoppers 16, 16' which converge inwardly towards the dispensing side and have the shape of a truncated cone in cross-section. Due to their special shape, the closing stoppers 16, 16' permit the closing of the dispensing openings 2', 3', with a specific force having to be overcome to pull the closing stoppers
16, 16' out of the dispensing openings 2', 3' in order to prevent, in addition to the holding elements 13, 13' and 14, 14' an accidental opening of the dispensing tube 5.

In the embodiment of the invention shown in the drawings, the guidance of the dispensing tube 5 on the mixer element 8 is ensured by its square inner and outer contours which are matched to one another; the cross-section of both the mixer element 8 and of the dispensing tube 5 is therefore substantially square. For the components to be pressed through the mixer element 8 as completely as possible, the spacing between the inner contour of the dispensing tube 5 and the outer contour of the mixer element 8 is as small as possible, whereby a displacement of the dispensing tube 5 still has to be possible. In addition, an incorrect placing of the dispensing tube 5 on the mixer element 8 can be prevented by the alignment of the elliptical shape of the shoulder region 11, which can be easily recognized from the outside, and of the dispensing region 9 of the container 1. Since the mixer element 8 consists of a material of stable shape, a reliable guidance of the dispensing tube 5 only in the axial longitudinal direction of the multicomponent cartridge is ensured.

In an alternative embodiment of the invention not shown in the drawing here, the outer contour of the mixer element 8 and the inner contour of the dispensing tube 5 are rectangular, that is have a substantially rectangular cross-section so that a guidance of the dispensing tube 5 in a manner secure against rotation is already ensured hereby. In addition, it is advantageous with such an embodiment that the dispensing tube 5 can be placed on the mixer element 8 only in the position required for the secure sealing and engagement of the closing stoppers 16, 16' in the dispensing openings 2', 3'. In this case, the shoulder region 11 of the dispensing tube 5 and the dispensing region 9 of the container 1 can also
have different shapes with different cross-sections, for example circular. It is nevertheless ensured by the specific shape of the mixer element 8 that the dispensing openings 2' or 3' and the stoppers 16, 16' engage into one another.

Instead of securing elements 7, 7' with latch noses 12, 12' arranged thereon and shown in the embodiment illustrated in the drawing, other suitable securing means can also be provided. Instead of the latch grooves 14, 14' or 15, 15', corresponding latch projections 11 can also be provided at the shoulder region of the dispensing tube 5, with then corresponding latch grooves having to be provided at the securing elements 7, 7' instead of the latch projections 13, 13'.
CLAIMS:

1. A multicomponent cartridge comprising
   a container having a plurality of chambers for the reception of different fluid components;
   a mixer element fixedly arranged on said container in communication with said chambers for receiving and mixing of the components from said chambers therein; and
   a dispensing tube mounted on said container in non-rotatable manner about said mixer element for directing and dispensing the mixture of the components therefrom, said dispensing tube being guided on said mixer element for axial displacement of said dispensing tube relative to said mixer element without rotation thereto.

2. A multicomponent cartridge in accordance with claim 1, wherein the outer contour of the mixer element and the inner contour of the dispensing tube are matched to one another for the displaceable guidance of the dispensing tube on the mixer element.

3. A multicomponent cartridge in accordance with claim 1 or claim 2, wherein the outer contour of the mixer element and the inner contour of the dispensing tube are matched to one another such that the dispensing tube can only be placed onto the mixer element in a predetermined position.

4. A multicomponent cartridge in accordance with any one of claims 1-3, wherein the outer contour of the mixer element and the inner contour of the dispensing tube are rectangular or elliptical.

5. A multicomponent cartridge in accordance with any one of claims 1-4, wherein holding elements are provided on at least one of the container and the dispensing tube to hold the dispensing tube in at least one of (a) an open position for dispensing of components from the dispensing tube and (b) in a closed position for sealingly closing the chambers.
6. A multicomponent cartridge in accordance with claim 5, wherein the holding elements are formed by latch grooves at the dispensing tube and by latch noses at the container.

7. A multicomponent cartridge in accordance with any one of claims 1-6, wherein the container has a dispensing region at its end at the mixer side which is of rectangular or elliptical shape and which is engaged around by a correspondingly shaped shoulder region of the dispensing tube.

8. A multicomponent cartridge in accordance with any one of claims 1-7, wherein in the closed position, sealing elements arranged at the dispensing tube sealingly close corresponding dispensing openings of the chambers.

9. A multicomponent cartridge in accordance with any one of claims 1-8, wherein securing elements are provided at one or more of the container and the dispensing tube to prevent the dispensing tube from being pulled off the container.

10. A multicomponent cartridge in accordance with any one of claims 1-9, wherein the mixer element consists of a material of stable shape.

11. A multicomponent cartridge in accordance with any one of claims 1-10, wherein the mixer element and the container are made in one single piece.