

DESCRIPTION

Title

5 Cartridge for a beverage or food substrate

Prior art

10 The invention relates to a cartridge having a wall region, one end of which is adjoined by a connecting region which is closed, in particular by a membrane, and at the opposite end of which optionally a bottom region is provided, wherein the wall region and optionally the bottom region define a cavity which accommodates a beverage substrate and/or foodstuff substrate.

15 Cartridges of this kind are known from the prior art and are used for example to produce cold beverages. In the process, the cartridge is inserted into a dispenser and the beverage substrate which is located in the cartridge is blended with a solvent, in particular water. In the past, there have often been problems in such systems with the insertion of the cartridge into the dispenser and/or with the sealing off of the cartridge/dispenser interface.

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Summary of the invention

Therefore, it was the object of the present invention to provide a cartridge which does not have the drawbacks of the prior art.

25 This object is achieved by a cartridge having a wall region, one end of which is adjoined by a
connecting region which is closed in particular by a membrane, and at the opposite end of
which optionally a bottom region is provided, wherein the wall region and optionally the
30 bottom region define a cavity which accommodates a beverage substrate and/or foodstuff
substrate, wherein the connecting region has at least one flange which is provided with a
positioning means and/or covering means.

The statements made with regard to this subject of the present invention apply equally to the other subjects of the present invention and vice versa.

35 The present invention relates to a cartridge, which is produced preferably from plastic, in particular by a molding and/or blow-molding process. The cartridge has a side wall which has

for example at least partially a round, rectangular, square, conical or oval cross section. A bottom is generally provided, in particular in one piece, at one end of the side wall. The side wall and optionally the bottom region define a cavity in which a beverage substrate and/or foodstuff substrate, in particular in liquid form, is provided. Provided at the other end of the wall region is a connecting region by way of which the cartridge is connected to a cartridge receptacle. This cartridge receptacle can be part of a dispenser or a component separate from the dispenser.

According to the invention, the connecting region is provided such that it has at least one flange. The flange protrudes from the connecting region and projects from a wall region of the connecting region preferably at an angle, particularly preferably at right angles. In order to produce the beverage or foodstuff, the flange is oriented preferably horizontally. Preferably, the flange is made of solid material, i.e. not manufactured in a hollow manner.

Also according to the invention, the flange is provided with a positioning and/or covering means. The positioning means ensures that the cartridge can be arranged on the dispenser and/or on the cartridge receptacle only in a particular position, in particular at a particular angle of rotation, in particular with regard to the longitudinal center axis of the cartridge. The covering means covers a region, in particular a region through which the finished beverage or foodstuff flows out. Preferably, the positioning means and the covering means are identical.

Preferably, the cartridge has two flanges which are arranged in an offset manner with respect to one another in the longitudinal direction. Either only one of the two flanges or both flanges has the positioning means and/or covering means.

Preferably, the positioning means and/or covering means is an indentation and/or protrusion which protrudes from the flange, in particular the circumference thereof.

Preferably, the positioning means and/or covering means is provided in one piece with the flange. For example, the positioning means and/or covering means is configured as a lug which is integrally formed at one point on the circumference of the flange. The thickness of the positioning means and/or covering means corresponds in this case at least substantially to the thickness of the flange.

Particularly preferably, the positioning means and/or covering means comprises a rectilinear circumferential region of the at least one flange. The flange is configured in particular such that its circumference away from the rectilinear circumferential region is curved. The shape of

the flange in a plane perpendicular to the longitudinal axis (also referred to as cross section or cross-sectional plane) is thus oval or round with a flat or rectilinear side which forms the positioning means and/or covering means. The flattened side can be used to fix the orientation of the cartridge about its longitudinal axis. Particularly preferably, an edge
5 extending parallel to the longitudinal axis of the cartridge is formed in each transition region between the rectilinear circumferential region and the curved circumferential region. Typically, the flange has exactly two of such edges, specifically in each case one edge at one end of the flattened region. It is also advantageously possible to fix a clear orientation of the cartridge on the basis of the edges.

10 According to one preferred embodiment, a neck is provided between the wall region and the connecting region. This neck can have for example a round cross section. The neck represents the wall region of the connecting region. The flange adjoins the neck preferably at right angles.

15 Preferably, the membrane which closes, in particular hermetically seals, the cartridge before it is used, is provided on the flange or one of the two flanges, in particular the end face thereof, in particular in a sealed manner. To this end, the flange, in particular the end face thereof, can have a bead, in particular a bead in the form of a circular ring, which cooperates
20 with the sealing tool during sealing. Preferably, the outer circumference of the membrane is less than the outer circumference of the flange. When two flanges are realized, the membrane is then provided preferably only on the outer flange.

Preferably, a fastening means is provided in the wall region and/or in the region of the neck.
25 By way of this fastening means, the cartridge can be connected to a dispenser. The fastening means can be for example a groove in which a fastening means on the dispenser engages.

Preferably, the cartridge has an identifier, with which it is possible to individualize the
30 cartridge. This identifier can be for example a means which is read by a reader on the dispenser using electromagnetic signals and/or mechanical means. For example, the identifier is a barcode, an impression which modifies and/or absorbs electromagnetic waves, for example light that is reflected thereby, or a FID or RFID. The identifier can contain for example information about the producer of the capsule, the contents of the capsule and/or
35 the expiration date. On the basis of this information, the dispenser can ascertain whether a beverage or foodstuff is being produced at all, and if so when, which one and under which

conditions. For example, the quantity of water which is blended with the substrate can be defined automatically and/or it is possible to determine whether the water is intended to be carbonated.

- 5 Preferably, the individualization is rendered unusable after the cartridge has been used. This can take place with electromagnetic radiation and/or mechanically, the latter for example when the cartridge and the cartridge receptacle described below are moved relative to one another.
- 10 A further subject of the present invention is a system having the cartridge according to the invention and a cartridge receptacle which is provided in the connecting region of the cartridge.

The statements made with regard to this subject of the present invention apply equally to the
15 other subjects of the present invention and vice versa.

This subject of the present invention relates to a system consisting of the cartridge according to the invention and a cartridge receptacle. The cartridge receptacle can be connected fixedly to the cartridge or be a replacement part which is removed from the cartridge after the
20 latter has been used, and is connected to a new cartridge. Preferably, the cartridge receptacle is made of plastic, in particular by injection-molding. Preferably, the cartridge receptacle is connected to a dispenser.

The cartridge receptacle may have a piercing means which perforates the membrane such
25 that the beverage substrate and/or foodstuff substrate flows in particular at the into a cavity, in particular a mixing chamber of the cartridge receptacle. Furthermore, the cartridge receptacle preferably has a diluent, in particular water, inflow. In the mixing chamber that is preferably present, the beverage substrate and/or foodstuff substrate can be mixed with the diluent. The finished beverage or foodstuff then runs out via a beverage and/or foodstuff
30 outflow.

According to a preferred embodiment, the inflow and the outflow are provided at opposite ends of the cartridge receptacle. Located in between is the mixing chamber, in which the beverage substrate and/or foodstuff substrate is mixed with the diluent. This preferred embodiment of the present invention has the advantage that particularly good blending
35 between the two components takes place.

Preferably, the piercing means is provided in a manner aligned with the inflow and the outflow. As soon as the membrane has been pierced, the beverage substrate and/or foodstuff substrate flows in particular past the piercing means and into the mixing chamber on account of gravity and/or pressure. As a result of the preferred arrangement of the
5 piercing means, particularly good mixing between the beverage substrate and/or foodstuff substrate and the solvent is again achieved.

Preferably, with regard to the direction of flow of the solvent, the flow cross section of the mixing chamber first expands and then narrows again, before the finished beverage leaves
10 the mixing chamber.

Preferably, the covering means, which is provided on the flange of the cartridge, covers the outflow of the cartridge receptacle.

Preferably, the flange on the cartridge, in particular the circumference thereof, cooperates in a sealing manner with the cartridge receptacle. To this end, the circumference of the flange can engage for example in a groove in the cartridge receptacle. This flange/groove connection can also serve as a force-fit, in order to prevent the cartridge from shifting relative to the cartridge receptacle during beverage or foodstuff production and the connection
15 between the cartridge and cartridge receptacle losing its tightness.

According to one preferred embodiment, the cartridge and the cartridge receptacle are provided to be longitudinally displaceable with respect to one another, in particular before the membrane is pierced. As a result of this longitudinal displacement, the piercing means can
25 then be brought into engagement with the membrane and pierce the latter.

Preferably, the cartridge and the cartridge receptacle are connected together in a rotationally fixed manner.

Preferably, the piercing means has a channel. Through this channel, a gas can be pushed into the cartridge, which pushes the beverage substrate and/or foodstuff substrate out of the cartridge, in particular into the mixing space of the cartridge receptacle.

Preferably, the cartridge receptacle has a spike guide, wherein the piercing means is
35 mounted in a displaceable manner within the spike guide, wherein the piercing means is displaceable between a retracted position, in which the piercing means is away from the

membrane, and an extended position, in which the piercing means pierces the membrane of the cartridge and projects into the cartridge. Preferably at least one lateral channel for conveying the beverage substrate and/or foodstuff substrate in the direction of the mixing chamber when the membrane is pierced by the piercing means has been introduced into the outer wall of the piercing means. Furthermore, a compressed-air line is particularly preferably integrated into the piercing means, wherein a compressed-air connection for connecting to a compressed-air source is formed on a side of the piercing means that is remote from the cartridge, said compressed-air connection being accessible in particular from outside the cartridge receptacle, and wherein a on a side of the piercing means that faces the cartridge

Description of the figures

In the following text, the invention is explained by way of figures 1 to 9. These explanations are merely by way of example and do not limit the general concept according to the invention. The explanations apply to the cartridge according to the invention and to the system according to the invention equally.

Figures 1 - 4 show a first embodiment of the system according to the invention.

Figures 5 - 8 show a further embodiment of the system according to the invention.

Figure 9 shows an embodiment with a fastening means.

Figure 10 shows a cartridge of a cartridge system according to a further embodiment of the present invention.

Figure 11 shows a cartridge receptacle of a cartridge system according to the further embodiment of the present invention.

Figure 12 shows a spike of the cartridge receptacle according to the further embodiment of the present invention.

Figures 1 - 4 show a first embodiment of the system according to the invention, which consists of a cartridge 1 and a cartridge receptacle 10. The cartridge is preferably manufactured from a plastic material, for example by injection-molding or by a blow-molding

technique. The cartridge has an, in the present case square, wall region 6, an in this case upper end of which is adjoined by a bottom region 7. The wall region 6 and the bottom region 7 delimit a cavity in which the beverage substrate and/or foodstuff substrate, in particular a concentrate, is located, with which a beverage or foodstuff can be produced. At the opposite end of the wall region from the bottom region, in this case the lower end, a connecting region 4 is provided, which in the present case has a neck 3 and a flange 5. The cavity of the cartridge is hermetically sealed by a closure 14, in this case a membrane, after it has been filled. The membrane 14, in particular a plastic foil is connected to the flange preferably cohesively, in particular by sealing. By way of the connecting region, the cartridge is connected to a cartridge receptacle. A positioning and/or covering means 8, which in the present case is provided as a protuberance, in particular as a lug-like protuberance, is provided on the flange 5. The lug is in this case integrally formed on the flange. Furthermore, as can be gathered in particular from figures 1b) and c), the system has a cartridge receptacle 10. This cartridge receptacle has a solvent, in particular water, inflow 15 (cf. figure 2) and a mixing chamber 13 in which the solvent and the beverage substrate and/or foodstuff substrate are mixed. The direction of flow of the mixture is indicated by the arrow 12 in figure 1c). The finished beverage/foodstuff leaves the mixing chamber through the outflow 11 and is collected in a container, for example a glass. Furthermore, as can be gathered in particular from figure 2, the cartridge receptacle has a piercing means 16, in this case a spike 16, which, as can be seen in particular in figure 3, pierces the membrane, which is sealed to the flange region of the cartridge, such that the beverage substrate or foodstuff substrate can flow into the flow chamber 13 in particular along the outer face of the spike, which is provided preferably with outflow channels 17 on its outer side for this purpose.

Figure 2 shows the system before the piercing means 16 comes into engagement with the membrane 14. In order to achieve this, the cartridge and/or the cartridge receptacle are shifted longitudinally with respect to one another such that the spike 16 penetrates the membrane 14, this being clearly visible in particular from figure 3c). In said figure, the channels 17 through which the substrate flows into the mixing chamber can also be identified particularly well. The flow of the substrate into the mixing chamber can be accelerated and controlled in a targeted manner by gas which is pushed into the cartridge through a duct 18 in the piercing mandrel 16. For example, the pressure in the cartridge can be adapted to the volumetric flow of the solvent.

As can be gathered in particular from figure 1d) and figure 4, the flange 5 of the cartridge 1 cooperates in a sealing manner with the cartridge receptacle and as a result ensures that

liquid leaves the mixing chamber only through the outflow 5. Furthermore, it is apparent in particular from these figures that the protuberance 8 in the present case is not only a positioning means but also covers the outflow 11 in the cartridge receptacle in particular in a sealing manner. The flange 8 and the protuberance 8 provided thereon can cooperate in a sealing manner, by way of their end face and/or by way of their circumference, with corresponding faces of the cartridge receptacle.

Figures 5 - 8 show a further embodiment of the system according to the invention. As regards the cartridge, reference can be made essentially to the statements made with regard to figures 1 to 4, wherein the cartridge also has, in addition to the flange 5, a fastening means 20 in its connecting region, said fastening means 20 connecting the cartridge 1 to the cartridge receptacle 10. Furthermore, the wall region 6 has in the present case an indentation 24 which allows a longitudinal displacement between the cartridge and the cartridge receptacle and optionally a dispenser and which also represents a guide for the cartridge.

As regards the cartridge receptacle 10, too, reference can be made to the statements made with regard to figures 1 - 4. However, as can be gathered in particular from figure 7, the cartridge receptacle in the present case has a fastening or securing ring 21 which is connected to the mixing chamber 13 by means of deformation and/or predetermined breaking points 22. This ring 21 cooperates in a force-fitting manner with the fastening means 20, for example in this case a collar 20 which is provided on the cartridge. Furthermore, it is clearly apparent from figure 7 that the cartridge receptacle 10, in addition to the spike 18, also has further piercing means 16. Through the spike 18, a gas is pushed into the cartridge, said gas pushing the substrate out of the cartridge. The opening means 16 cut into the membrane, in this case with angled cuts, which then form flaps which are pushed downward under the pressure of the substrate and thus allow the substrate to flow out more easily. A person skilled in the art will recognize that a piercing means 16 may also suffice, for example that it is also possible to use the piercing of the membrane and the running out of the substrate as explained with reference to figures 1 - 4 in the present case. Of course, the current opening means 16, 18 can also be transferred to the embodiment according to figures 1 to 4.

Figure 5 shows the system prior to piercing. Figure 6 shows the system after the membrane has been pierced. By way of a relative movement, illustrated by means of arrow 2, between the mixing chamber 13 and the cartridge 1, the predetermined deformation points and/or

predetermined breaking points 22 are deformed or destroyed, respectively, such that the cartridge can move together with the ring 21 in the direction of the mixing chamber 13. As a result of this movement, in which the flange 5 is also introduced into the groove 27 and cooperates with the latter in a sealing manner, the membrane 14 is perforated and the substrate can flow out of the cartridge into the mixing chamber, in which it is mixed with a solvent, which is metered into the mixing chamber through the inflow 15, and leaves the mixing chamber through the outflow 11.

Figure 9 shows a fastening means, in this case a groove 25, in the wall region of the cartridge. It is possible for a fastening means 26, with which the cartridge is fastened to a dispenser, to engage in this groove.

Figure 10 illustrates four depictions of a cartridge 2 according to a further exemplary embodiment. The cartridge 2 and the associated cartridge system made up of cartridge 2 and cartridge receptacle 10 are similar in terms of their function to the cartridge 2, explained with reference to figures 1 to 4, according to the first embodiment of the present invention.

However, the cartridge 2 shown in figure 10 has, by contrast, two flanges 5. Both flanges 5 serve to fasten the cartridge receptacle 10 to the cartridge 2. In addition, the membrane 15 is sealed to the outer flange 5.

The cross section (perpendicular to the longitudinal axis of the cartridge 2) of the two flanges 5 has a substantially round circumference, wherein a rectilinear circumferential region 28 is provided on one side. In the rectilinear or flattened circumferential region 28, the circumference extends as a virtually straight line (visible on the underside of the flange 5 in the right-hand depiction in figure 10), while the circumference of the flange 5 away from the rectilinear circumferential region 28 extends as a curved line. The rectilinear circumferential region 28 serves as a positioning means, by way of which the orientation of the cartridge 2 is fixed with respect to the cartridge receptacle 10.

In figure 11, the matching cartridge receptacle 10 can be seen. It is apparent that the circumference of the cartridge receptacle 10 has a shape corresponding to the contour of the two flanges 5 illustrated in figure 10, such that the cartridge 2 and cartridge receptacle 10 can be connected together only in a particular orientation with respect to one another. The rectilinear circumferential region 28 thus serves as a twist prevention means.

Advantageously, this also defines the region of the cartridge 2 in which the gas is pushed into the cavity.

Arranged within the mixing chamber 13 is a spike guide 29 in which the spike 16 (also referred to as piercing means) is guided in a movable manner. Thus, in the further embodiment, the perforation of the membrane 14 is not brought about by a relative movement between the cartridge 1 and cartridge receptacle 10, but rather the spike 16 is guided in a movable manner in the cartridge receptacle 10 that is fixed relative to the cartridge 1. In this way, the spike 16 can be transferred from a retracted position (corresponds especially to the initial state of the system), in which the spike 16 is away from the membrane 14, into an extended position, in which the spike 16 protrudes into the cavity of the cartridge 1 and in the process perforates the membrane 14. In this extended position, the cartridge 1 is thus opened and the substance can pass through outflow channels 17 in the outer face of the spike 16, past the membrane 14, and into the mixing chamber 13.

On a side of the cartridge receptacle 10 that faces the cartridge 2, a latching strip 30 is provided, which, in order to fasten the cartridge 2 to the cartridge receptacle 10, engages around one of the two flanges 5 in a form-fitting and/or force-fitting manner. In this way, a relative movement between the cartridge 1 and cartridge receptacle 10 is prevented.

Figure 12 illustrates a schematic view of a spike 16 which is guided in the spike guide 29 shown in figure 11. The spike 16 has the inner channel 18 for feeding gas into the cartridge 2, and the outer outflow channels 17, through which the substrate can flow past the sealing foil pierced by means of the spike 16 and into the mixing chamber 13. A compressed-air connection of the compressed-air line 34 for connecting to a compressed-air source is formed on a side of the spike 16 that is remote from the cartridge 1, said compressed-air connection being accessible from outside the cartridge receptacle 10, wherein a compressed-air outlet of the compressed-air line 34 for blowing the compressed air into the cartridge 1 is formed on a side of the spike 16 that faces the cartridge 1.

The spike 16 is mounted in a displaceable manner in the spike guide 29 such that it can be moved from a retracted position, in which it is away from the sealing foil on the cartridge 2, into an extended position, in which it projects into the cavity of the cartridge 2 and in the process pierces the sealing foil.

An arrangement in which the spike shown in figure 12 is arranged in the spike guide of the cartridge receptacle 10 shown in figure 11 and the cartridge receptacle 10 shown in figure 11 is then connected to the cartridge 2 shown in figure 10 represents a cartridge system according to a further exemplary embodiment of the present invention.

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List of reference signs

	1	Cartridge
	2	Direction of movement
5	3	Neck
	4	Connecting region
	5	Flange
	6	Wall region
	7	Bottom region
10	8	Positioning and/or covering means, indentation and/or protuberance
	9	Inflow of the substance, piercing means
	10	Cartridge receptacle
	11	Outflow of substance plus solvent/water
	12	Direction of flow of substance plus solvent/water
15	13	Mixing chamber
	14	Closure, membrane
	15	Solvent inflow, water inflow
	16	Piercing means, spike
	17	Outflow channels
20	18	Gas inlet
	19	Seal, collar seal
	20	Fastening means, collar
	21	Fastening ring, securing ring
	22	Deformation and/or predetermined breaking point
25	23	Indentation and/or protuberance of the cartridge receptacle
	24	Indentation, guide
	25	Form-fitting means for a fastening means 26
	26	Fastening means
	27	Sealing means, groove
30	28	Rectilinear circumferential region
	29	Spike guide
	30	Latching strip
	31	Compressed-air line

PATENT CLAIMS

1. A cartridge (1) having a wall region (6), one end of which is adjoined by a connecting region (4) which is closed in particular by a membrane (14), and at the opposite end of which optionally a bottom region (7) is provided, wherein the wall region and optionally the bottom region define a cavity which accommodates a beverage substrate and/or foodstuff substrate, characterized in that the connecting region (4) has at least one flange (5) which is provided with a positioning means and/or covering means (8).
2. The cartridge (1) as claimed in claim 1, characterized in that the positioning means and/or covering means (8) is an indentation and/or protrusion which protrudes from the flange, in particular the circumference thereof.
3. The cartridge (1) as claimed in claim 2, characterized in that the positioning means and/or covering means (8) comprises a rectilinear circumferential region (28) of the at least one flange (5), wherein the circumference of the flange (6) is formed in a preferably curved manner away from the rectilinear circumferential region, wherein an edge extending parallel to the longitudinal axis of the cartridge (1) is particularly preferably formed in each transition region between the rectilinear circumferential region and the curved circumferential region.
4. The cartridge (1) as claimed in one of claims 1 – 3, characterized in that a neck (3) is provided between the wall region (6) and the connecting region (4).
5. The cartridge (1) as claimed in one of claims 1 – 4, characterized in that the membrane (14) is provided on the flange.
6. The cartridge (1) as claimed in one of claims 1 – 5, characterized in that a fastening means (26) is provided in the wall region (6) and/or in the region of the neck.
7. The cartridge (1) as claimed in one of claims 1 – 6, characterized in that the cartridge (1) has two flanges (5) which are arranged in an offset manner with respect to one another in the longitudinal direction of the cartridge (1), wherein only one of the two flanges (5) or both flanges (5) have the positioning means and/or covering means (8).

8. A system having a cartridge (1) as claimed in one of the preceding claims and a cartridge receptacle (10) which is provided in the connecting region (4) of the cartridge.
- 5 9. The system as claimed in claim 8, characterized in that the cartridge receptacle (10) optionally has a piercing means (16) which perforates the membrane (14), a diluent, in particular water, inflow (15), a mixing chamber (13) in which the beverage substrate and/or foodstuff substrate is mixed with the diluent, and a beverage and/or foodstuff outflow (11).
- 10 10. The system as claimed in either of claims 8 and 9, characterized in that the inflow (15) and the outflow (11) are provided at opposite ends of the cartridge receptacle (10).
11. The system as claimed in one of claims 8 – 10, characterized in that the piercing means (16) is provided in a manner aligned with the inflow (15) and the outflow (11).
- 15 12. The system as claimed in one of claims 8 – 11, characterized in that, with regard to the direction of flow of the solvent, the flow cross section of the mixing chamber first expands and then narrows again.
- 20 13. The system as claimed in one of claims 8 – 12, characterized in that the covering means (8) covers the outflow (11) of the cartridge receptacle (10).
14. The system as claimed in one of claims 8 – 13, characterized in that the flange cooperates in a sealing manner with the cartridge receptacle (10).
- 25 15. The system as claimed in one of claims 8 – 14, characterized in that the cartridge (1) and the cartridge receptacle (10) are connected together in a rotationally fixed manner.
- 30 16. The system as claimed in one of claims 8 – 15, wherein the cartridge receptacle (10) has a spike guide (29) and the piercing means (16) is mounted in a displaceable manner within the spike guide (29), wherein the piercing means (16) is displaceable between a retracted position, in which the piercing means (16) is away from the membrane (14), and an extended position, in which the piercing means (16) pierces the membrane (14) and projects into the cartridge (1).
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17. The system as claimed in one of claims 8 – 16, characterized in that at least one lateral channel (71) for conveying the beverage substrate and/or foodstuff substrate in the direction of the mixing chamber (8) when the membrane (14) is pierced by the piercing means (16) has been introduced into the outer wall of the piercing means (16).

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18. The system (10) as claimed in one of claims 8 to 17, wherein a compressed-air line (31) is integrated into the piercing means (16), and wherein a compressed-air connection of the compressed-air line (31) for connecting to a compressed-air source is formed on a side of the piercing means (16) that is remote from the cartridge (1), said compressed-air connection being accessible in particular from outside the cartridge receptacle (10), and wherein a compressed-air outlet of the compressed-air line (31) for blowing the compressed air into the cartridge (1) is formed on a side of the piercing means (16) that faces the cartridge (1).

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