Container Transfer System

The invention relates to a container transfer system having at least one first and at least one second container, which can be connected to one another in a media-conducting manner by means of a connection device, which has a transfer device which, held in a locked position by means of at least one locking device, prevents an exchange of media or permits said exchange in at least one unlocked position in which the transfer device is guided in a longitudinally displaceable manner in a seat of the connection device for a transfer operation, with the locking device being able to be transferred to an unlocked position by means of the movement of at least one of the containers.

Such systems make it possible for desired media, which constitute the ingredients of a specific container, to be brought into contact, dissolved or mixed with one another by means of the connection device. Such operations are often required in the medical and pharmaceutical fields in order to produce preparations which consist of at least two initially separate components, which must be mixed with one another before use. A particularly common application area is the production of preparations for parenteral applications for medical or diagnostic purposes. In the case of the production of preparations for parenteral purposes, for example an infusion, it is often necessary to add to a solvent already located in the infusion bottle, such as water, isotonic NaCl solution, a glucose solution, a lactated Ringer's solution or the like, a drug, for example antibiotics, in liquid or powder form, which is to be dissolved in the solvent. In the medical field in particular, it is essential that errors are avoided during such a process. These errors are described in detail for example by E.A. Flynn et al. in "Observational Study of Accuracy in compounding i.v. mixtures at five hospitals" (Am. J. Health-Syst.

Pharm. Vol. 54, Apr. 15 1997, 904-912) on page 906, and according to this source they include: wrong drug, wrong dose, wrong volume of solvent, wrong composition of the solvent, wrong reconstitution process, amongst other things. Similarly, reference is made to the current shortcomings with respect to medical safety in parenteral applications by Richard Bateman et al. in the publication "Errors associated with the preparation of aseptic products in UK hospital pharmacies..." (Qual. Saf. Health Care 2010; 19: e 29) and by D.H. Cousins et al. in the publication "Medication errors in intravenous drug preparation and administration...." (Qual. Saf. Health Care 2005; 14: 190-195).

Furthermore, it is desirable in particular for logistical reasons that the different components of the drug can be stored separately from one another when one component must be stored at a cool temperature, as is often the case for sensitive biotechnology products, which must be dissolved before the administration as an infusion in order to prevent the cold chain having to be extended to include the solvent.

Container transfer systems are state of the art for the simple and sterile realization of transfer operations for the above-mentioned objectives. A transfer system of the type described above is disclosed in the document WO 95/00101. In the known solution, the transfer device has, as a support for a piercing spike, which is formed in a conventional manner as a cannula with perforation tips located on both sides, a flexible support part in the form of a thin-walled plate, which plate simultaneously forms the locking device of the transfer device. For this purpose, the flexible plate has a nub-like circumferential edge, which engages in a latching groove on the inner side of the seat of the connection device. When a corresponding mobile container is introduced into the seat, the perforable opening region of the mobile container comes into contact with the hollow piercing spike and, with additional

movement, it deforms the flexible plate of the transfer device in order to release the locking on the wall of the seat. The axial force acting on the locked latch mechanism depends on the perforation resistance at the opening region of the mobile container. The functional reliability of the locking device therefore leaves a lot to be desired.

Based on this prior art, the problem addressed by the invention is to provide a container transfer system which is distinguished by improved functional reliability.

According to the invention, this problem is solved by a transfer system having the features of Claim 1 in its entirety.

According to the characterizing part of Claim 1, a significant distinguishing feature of the invention is that additional control means are provided on the respective mobile container which at least partially surround this container at the external circumference and which activate the locking device of the transfer device for an unlocking. The unlocking operation thus takes place in a controlled manner, which increases safety with respect to operating errors.

In particularly advantageous exemplary embodiments, the additional control means are provided on the outer side or face side of a cap part which, on the mobile container, surrounds an opening region which can be perforated by a hollow piercing spike of the transfer device. Alternatively, the control means can be formed by the specific cap form itself or can be an integral component of the container in question.

The arrangement can particularly advantageously be such that the locking device has a blocking element which, in the locked state, prevents the opening displacement movement of the hollow piercing spike of the transfer device and

which can be transferred to the unlocked state allowing the displacement movement by means of mechanical contact with the control means of the mobile container.

Because the invention allows the locking device to be activated by means of special control means, the invention provides the particularly advantageous opportunity to form between the mobile container and the connection device an encryption which rules out an operating error. In a particularly advantageous manner, it is possible to provide for this purpose that, in order to form an encryption which acts as a key-lock system between the mobile container and the connection device as a control means, a key element comprising a physical coding is provided on the mobile container and that, as the lock of the system, an opening having a physical coding provided on the inner side is provided on the body of the blocking element in such a way that, in the case of corresponding coding, the control means of the container can be introduced into the opening of the blocking element in order to transfer said blocking element to the unlocked state. Consequently, a transfer operation can take place only with a container combination intended for a particular application, so that the safety which is required in particular in medical applications is guaranteed.

An important factor is that checking of the coding by the control means and the blocking means can occur with only minimal force and on short, straight paths in order to make the application as intuitive and simple as possible and to prevent tilting. It is also advantageous for the coding to be redundant, for example distributed many times in a uniform manner over the circumference, which prevents tilting and facilitates the orientation during introduction.

The coding of the key element can be formed on the cap part of the mobile container by means of recesses or projections provided at the circumference, while

in a manner corresponding thereto, the coding of the blocking element is formed by recesses and/or projections which are provided on the wall of its opening and which, in the case of corresponding coding, complement the recesses and/or projections of the mobile container.

In an advantageous manner, the connection device can have, as a seat for the transfer device and the locking device, a housing in the form of a cylindrical sheath, which can be connected or is connected at the one end to a container, and is accessible at the other end for a mobile second container and which forms a guide for displacement movements of the transfer device and the locking device.

The transfer device can have a disk as a support for a centrally located hollow piercing spike which projects on both sides of the disk, with guide parts for the guiding of the disk in displacement movements in the sheath being provided at the circumference of the disk as are locking elements which can be activated by the locking device.

In this respect, the arrangement can be such that, at the circumference of the disk, first locking elements are provided, by means of which, in a start position, the disk is detachably latched on catches of the sheath against an opening displacement movement, and second locking elements are also provided which, in their normal blocking position, hold the blocking element in the locked state and which, by means of contact with the control means of the mobile container introduced into the blocking element, can be controlled out of the blocking position into an unblocked position, in which they transfer the blocking element into the unlocked state.

The first and second locking elements can be formed on tongue parts which can move in a flexible manner relative to one another, which are formed in the form of

tabs distributed at the circumference in the disks and raised from the disk plane.

The respective tab for the second locking element can have a control part which engages in the opening of the blocking element which, by means of contact with the control means of the mobile tab introduced into the opening, moves the respective second locking element out of the blocking position and unlocks the blocking element. In the case of a provided key-lock encryption system, this unlocking operation can occur only when the control means of the mobile flask can be sufficiently introduced into the opening of the blocking element in the case of corresponding coding.

When the unlocked state is reached, the blocking element can be moved by means of the mobile container to the disk of the transfer device, with the tabs being guided in control channels of the blocking element in such a way that the tongue parts forming the latching to the sheath are moved in the control channels in an unlatching manner, so that the transfer device is free for the opening displacement movement and can be carried along for its opening movement by means of the movement of the blocking element.

It is additionally possible to form, for the tongue parts forming the latching to the sheath, second catches on the sheath, which latch the transfer device in an end position at the end of a connection operation.

In order to fix the mobile container to the connection device by means of a form-fitting securing engagement when the end position is reached, inwards projecting detents can be provided at the circumference of the disk of the transfer device, which form, at the end position of the transfer device, a snap connection with a circumferential edge of the key element-comprising cap part of the mobile

container.

The invention is explained in detail below with reference to the drawings, in which:

Fig. 1 shows a perspective oblique view of an exemplary embodiment of the container transfer system according to the invention;

Fig. 2 shows a schematically simplified longitudinal section of a container in the form of a flask containing a media component, the content of which flask is to be transferred to a second container by means of the transfer system according to the invention;

Fig. 3 shows a perspective oblique view of the flask of Fig. 2, depicted with removed cap cover part;

Fig. 4 shows a perspective partial view, depicted in an exploded manner, of the exemplary embodiment, with the state before the introduction into the connection device of the transfer system being depicted;

Fig. 5 shows a perspective oblique view of the media transfer device forming a component of the connection device;

Fig. 6 shows a perspective oblique view of the blocking elements of the connection device of the exemplary embodiment;

Fig. 7 shows a perspective oblique view of the cap part of the mobile flask, viewed on the free end face;

Fig. 8 shows, in an exploded perspective oblique view, the encryption system functioning according to the key-lock principle, with the cap part of Fig. 7 forming the key element being depicted before the introduction into the blocking element of Fig. 6 serving as the lock of the system;

Fig. 9 shows a schematically simplified partial longitudinal section of the connection device containing the transfer device and of the associated opening region of the mobile flask, with the latter

being depicted with its cap part in a centered position before the introduction into the blocking element of the connection device;

Fig. 10 shows, *in a depiction corresponding to Fig. 9, a further stage of* the connection/transfer operation, with the cap part of the flask being partially introduced into the blocking element in the case of corresponding coding of the key element of the flask and of the blocking element serving as the lock and with the part at the top of Fig. 10 showing a section plane rotated 90° relative to Fig.9;

Figs. 11 to 15 show, in a manner similar to Figs. 9 and 10, partial longitudinal sections in which successive positions in the process of a connection/transfer operation are depicted;

Fig. 16 shows a perspective oblique view corresponding to Fig. 15;

Fig. 17 shows, to illustrate the coding principle, the contour of the cap part of the flask forming the key element, with two coding regions for a respective subgroup of the coding being illustrated at each of the three sides of the Reuleaux triangle shape;

Figs. 18 and 19 show the cap part inserted into the blocking element, which in turn has a coding allowing the insertion;

Figs. 20 to 22	show depictions, which are similar to Figs. 17 to 19, of two additional coding examples;
Figs. 23 to 25	show, in corresponding depictions, two additional examples of the coding;
Figs. 26 to 28	show sketch-type depictions to illustrate different contour shapes for the key element on the cap part of the mobile flask;
Fig. 29	show a depiction, which is shown in a highly schematic manner and partially longitudinally sectioned, of a modified exemplary embodiment of the container transfer system according to the invention;
Figs. 30 and 31	show depictions, which are similar to Fig. 29, of a third or fourth exemplary embodiment;
Fig. 32	shows, in a sketch-type depiction, a cross section of the transfer device of the exemplary embodiment of Fig. 31;
Fig. 33	shows a sectional depiction, which is similar to Figs. 30 and 31, of an additional exemplary embodiment and
Fig. 34	shows a schematically simplified depiction of the blocking element of the exemplary embodiment of Fig. 33.

The invention is explained in detail below with reference to exemplary embodiments in which the transfer system is intended for a media exchange between containers, which are preferably used for medical, diagnostic, enteral or parenteral applications. In this regard, the specific exemplary embodiments depicted in the drawings show (see in particular Fig. 1) a first container in the form of an infusion container 1 which is in the form of a plastic container, which is produced for example using the known blow-fill-seal process, which is described for instance in EP 2 269 558 A1 and which is also known to experts under the name

bottelpack® system. Such containers usually have at least one connection 3 for an infusion set. When, for the purposes of preparation of a specific infusion fluid, a liquid or powder-form additional media component is to be added to the contents of the infusion container 1, which for example contains a volume of solvent, special safety requirements must be met.

In medical, diagnostic applications, in the case of the media transfer involving on the one hand an additional component, which is usually located in a glass flask or polymer flask 5 in such applications, it is not only necessary to pay attention to sterility, it is also necessary to ensure that the media transfer takes place from a flask 5, which contains a certain quantity of the respective required substance, into an infusion container 1. For such a transfer operation which is to be realized in a simple and sterile manner it is possible to proceed, as is disclosed in the document WO 95/00101, in such a way that a connection device can be mounted or is mounted on the infusion container 1. The connection device contains a transfer device with a hollow piercing spike in the form of a cannula which extends in a continuous manner between perforation tips and is normally locked in an inactive position, in which both perforation tips of the piercing spike are located at a spacing from a perforable opening region of the infusion flask 1 and from a perforable perforation region of the flask 5 provided for the transfer operation. The connection device has a cylindrical, sheath-like seat, into which the flask 5 provided for the transfer operation can be introduced, with the sheath-like seat forming a guide for a displacement movement of the flask 5, during which the perforable opening region of the flask 5 approaches the piercing spike and thereby releases the locking of the transfer device and moves said transfer device into an end position, in which the hollow piercing spike perforates the opening regions of the flask 5 and infusion flask 1 and establishes the media connection.

The container transfer system according to the invention is in this regard based on the same functional principle. The essential difference of the invention with respect thereto is however that an unlocking of the transfer device identified in the figures with the reference numeral 27 and thus the establishment of a media-conducting connection is only possible when using a mobile container specifically provided for the respective transfer operation, i.e. the flask 5. According to the invention, special control means are provided on the mobile flask 5, by means of which the locking device of the transfer device can be unlocked. The risk of operating errors which exists with the above-mentioned prior art, that is to say a combination/mixing of substances and/or volumes which is not permitted, is thus ruled out thanks to an encryption between the flask 5 and the connection device 7. The particulars of the invention permitting such an encryption between the flask 5 and the connection device 7 can be more clearly seen in the additional Figures 2ff.

It can be seen from Figures 2 and 3, which separately depict a mobile flask 5, that a cap part 13, for example in the form of an elastomer plug which is not depicted in detail, is mounted on the neck part 11 of the flask 5, on which the perforable opening region 48 is located, which cap part consists in the current example of an integral injection molded plastic part. Figures 2 and 3 show the cap part 13 in the initial state before usage, with a molded cover 15 serving as a genuineness indicator being located on the top side of the cap part 13, which can be removed in a simple manner and without necessary auxiliary tools for example by means of breaking off, levering off or twisting off in order to use the flask 5. Instead of the cover 15, a removable foil could be provided. After removal of the cover 15, a central opening 17 is exposed on the cap part 13, which central opening is aligned with the perforable opening region 48 on the neck part 11 of the flask 5. If a radiation-permeable foil is provided instead of the cover 15, such a foil can be irradiated with high-energy radiation, e.g., UV radiation or beta radiation, in order to kill any germs which may be present on the

elastomer surface (perforation surface). The cap part 13 which is preferably formed from a polymer can, as Fig. 2 shows, be connected in a form-fitting, force-fitting or bonded manner to the edge 19 of the neck part 11 of the flask 5. Alternatively, the coding of the cap part 13 could be an integral component of the flask 5. Alternatively, caps 13 according to the invention with coding can also be part of multi-part plastic closures which are known per se, as described for example in WO 2011/032798 A1, WO 2011/039004 A1 and EP 0 655 042 B1, which are advantageously used in particular in the freeze-drying of drugs or medicinal products.

The contour of the cap part 13 has the form of a Reuleaux triangle with rounded edges. In order to form the encryption in accordance with the key-lock principle, the cap part 13 with the external circumference of the Reuleaux triangle forms a physically coded key element, with the coding on the cap part 13 being formed by recesses 21. The recesses 21 have the form of grooves which are sunk inwards from the circumference, the circumferential length of said grooves being delimited by walls 23 which, relative to the central opening 17, define radial planes and with only a few of these walls 23 being numbered in Fig. 7. The axial depth of the recesses 21 is smaller than the thickness of the cap part 13, so that the recesses 21 on the front face visible in Fig. 7 are open and the side of the cap part 13 which faces the main part of the flask 5 and which is visible in Fig. 8 is free of recesses 21.

As a codable lock for the key-lock system, an annular body 25 (see in particular Figures 6 and 8) is provided, which forms a blocking element as a component of the locking device of the transfer device 27, which is depicted separately in Fig. 5. The annular body 25 has an opening 29 for the introduction of the key element formed by the cap part 13, which opening is adapted to the circumference of the cap part 13, in other words, it has the form of a Reuleaux triangle. On the inner side, the

opening 29 is provided with a coding in the form of projections 31 which, in the case of corresponding coding, complement the recesses 21 of the key part on the cap part 13. The projections 31 do not extend up to the edge of the annular body 25 lying at the top in Fig. 6 so that, for the contacting of the cap part 13 at the start of a transfer operation an alignment plane is defined, on which the cap part 13 can be brought into the rotational position of the alignment of the recesses 21 and projections 31 and, in the case of corresponding coding, can then be introduced into the opening 29 of the annular body 25. In particular, viewed in the viewing direction of Fig. 8, the projections 31 form shoulders in the upwards direction, which can be brought into contact with the corresponding shoulders on the set back ends of the recesses 21 of the cap part 13, so that in an axial feed movement of the container or flask 5 towards the infusion container 1, the cap part 13 necessarily carries along the annular body 25.

Fig. 4 shows the initial state before the start of a transfer operation, with the annular body 25 being located at the top end of a sheath-like seat 9 of the connection device 7. As is shown most clearly by Fig. 6, the annular body 25 forming the blocking element has at the external circumference axially continuous grooves 33, by means of which the annular body 25 is guided on (not depicted) axial guide rails of the sheath-like seat 9. The transfer device 27 depicted separately in Fig. 5 is guided in an axially displaceable manner below the annular body 25 in the sheath-like seat 9 for its opening movement. As Fig. 5 most clearly shows, the transfer device 27 has a disk 35 adapted to the internal diameter of the sheath-like seat 9 as a support for a centrally arranged piercing spike 37 which, in a manner known per se, is formed as a multichannel cannula and projects on both sides of the disk 35 in order to perforate both the opening region 50 of the infusion flask 1 and the opening region 48 of the flask 5 for the opening operation. Raised functional elements are located at the circumference of the disk 35. Of these functional

elements, three guide tabs are identified with the reference numeral 39, by means of which the disk 35 is guided in travel movements on the inner wall of the sheath-like seat 9. Located between two consecutive guide tabs 397 there are in each case two tabs with three tongue parts 41, 43 and 45 which are connected to one another. In addition, inwards projecting lugs 47 are located above the surface of the disk 35 for the formation of a snap connection, as will be discussed below.

As Fig. 4 shows, the annular body 25 forming the blocking element of the locking device is located at the top edge of the sheath of the seat 9. The annular body 25 is in the locked state, i.e. the not axially moveable state. The transfer device 27 located under the annular body 25 is in turn locked against an axial displacement movement, because the disk 35 with the detents 49 on the tongue parts 41 which splay outwards slightly is latched in a latch groove 51 of the sheath. The annular body 25 serving as a blocking element is thus also in a locked position, because the tongue parts 45 of the raised tabs of the disk 35 prevent the movement of the annular body 25. This state is depicted in Fig. 9. When the codings of the cap part 13 of the flask 5 and of the annular body 25 correspond, the cap part 13 can be introduced into the annular body 25, as is shown by Figures 10 and 11. In the course of this movement, the spike 37 perforates the opening region 48 of the flask 5 and the cap part 13 comes into contact with a control lug 53 on the tongue parts 43. During the further introduction movement of the cap part 13, the tongue parts 43, 45 are thus moved for the unlocking operation. The annular body 25 is thus displaceable towards the disk 35 of the transfer device 27, with the tongue parts 41, 43, 45 of the tabs being guided in guide channels 55 of the annular body 25 in such a way that the catches 49 on the tongue parts 41 are raised from the catch groove 51 of the sheath of the seat 9. The achievement of this state is depicted in Fig. 13. The flask 5 with the cap part 13 can thus be further introduced as Fig. 14 shows, with the annular body 25 being carried along, which annular

body in turn contacts on the disk 35 of the transfer device 27 and carries along same for the opening movement, see Fig. 4, with the piercing spike 37 also perforating the opening region 50 of the infusion container 1. For the purpose of a transfer operation, the hollow piercing spike 37 has two transfer channels extending parallel to the respective piercing device.

At the base of the sheath of the seat 9 there is an additional catch groove 57 for the formation of a catch for the transfer device 27 in the end position at the conclusion of the connection operation, as is depicted in Figures 15 and 16. In this end position, the lugs 47, which, as Fig.5 depicts, project inwards above the disk 35, form a snap connection with the cap part 13 in that they overlap the edge 59 thereof which is free of the recesses 21, see Fig. 16. The flask 5 is thus secured in a form-fitting manner on the connection device 7 when the end position of the transfer operation is achieved.

Figures 17 to 25 illustrate, in the form of functional diagrams, the encryption system provided in the depicted exemplary embodiment. Fig. 17 shows that, on the circumference of the cap part 13, which has the form of a Reuleaux triangle with rounded edges, a coding region is provided on each triangle side, with each coding region having two groups 61 and 63 with coding positions and the groups 61, 63 being spatially separated from one another by means of a code-free intermediate region 65. Because the same code groups 61, 63 are provided on each triangle side with code positions which are identically selected for the formation of a corresponding key, the key element can be inserted in three positions (orientations) into a respective identically coded lock. For the present application, the coding of code positions of one of the groups 61, 63 identifies the filling volume of the corresponding flask 5, while the respective other group 61 or 63 represents the nature of contents of a container. In the present example, as mentioned, the coding

on the cap part 13 is in each case formed by recesses 21 provided inside the groups 61, 63. The sketch-type depiction of Fig. 17 depicts the unprocessed state, without coding by means of recesses 21.

In the present example, the coding in the respective group 61 identifies the nature of container contents, for example the nature of a solvent located in the infusion flask 1, while the coding of the group 63 identifies a volume, for example the volume of a solvent, to which a substance located in the flask 5 is to be added or can be added. On the annular body 25 forming the lock, in a corresponding manner the projections 31 identify for the respective coding groups 61, 63 the volume of the infusion flask 1 or the nature of container contents, for example of the specific solvent located in the infusion flask 1.

Fig. 18 shows an example in which the cap part 13 signals by means of a recess 21 in a first coding position of the group 61 that the flask 5 is intended for supply to a constituent A of flask 1, while the group 63 does not contain any recess 21, which in turn signals that the flask 1 contains a certain solvent volume. In the example of Fig. 19, a recess 21 is formed in the groups 63 over several coding positions, which signals a different solvent volume, while a recess in the groups 61 at a coding position different from that of Fig. 18 signals a different solvent, for example a solvent B, for example 50 ml, corresponding to the recess in the group 63.

Figures 20 to 22 show examples in which the flask 5 signals by means of longer recesses 21 in the groups 61 that it is intended both for the media supply to a solvent A and also to a solvent B in the flask 1. The absence of a recess 21 in the groups 63 simultaneously signals that the addition is intended only for a certain solvent volume in the flask 1, for example 250 ml. Accordingly, the example of Fig. 21 shows that the flask 5 can be combined with a flask 1 which contains the solvent

A at a volume of 250 ml. As Fig. 22 shows, the combination is not however possible with a flask 1 which contains the solvent B at a different volume, for example 50 ml.

In a manner corresponding to Figures 20 to 22, Figures 23 to 25 illustrate examples in which the flask 5 signals by means of a recess 21 in only one coding position of the group 61 that the flask 5 is intended only for a solvent A in the flask 1, whereas it is signaled by means of a recess 21 over two coding points of the group 63 that combination across a greater volume range is permitted, for example for 100 to 250 ml of the solvent. As Fig. 24 shows, the flask 5 corresponds to an infusion flask with the solvent A at a volume of 250 ml. By contrast, Fig. 25 shows that combination is ruled out in the case of a different solvent B as well as in the case of a different solvent volume.

Figures 26 to 28 illustrate, in sketch-type depictions, additional options for forming the contour of the uncoded key element, with Fig. 26 showing the triangular form selected in the in this respect described exemplary embodiment, while Fig. 27 shows a different, non-circular contour form in the form of a kind of ellipse 69. It is also possible in the case of a circular contour form to provide design irregularities, as Fig. 28 shows, such as a pattern of projections and recesses, of which only one projection 71 is depicted in Fig. 28, which can in turn be provided in groups which are spaced apart from one another. In the case of a circular configuration, the key-lock connection is only possible in an unambiguous, relative introduction position (orientation), while coding groups can be provided on both long curve sides in the case of the ellipse 69 depicted in Fig. 27 so that the key-lock connection is possible in two relative rotational positions. In order to form corresponding coding groups, instead of the projections recesses of a component can also be provided, which then fit with projections of the respective other component.

Fig. 29 illustrates, in a very schematically simplified depiction, an exemplary embodiment, in which the body 73 of the transfer device supporting the hollow piercing spike 37 itself forms a kind of pot, which with its inner wall 75 forms the lock element, into which the cap part 13 of the flask 5 can, in the case of corresponding coding, be introduced in such a way that the cap part 13, when it contacts on the body 73, displaces same for the perforation operation. Because the body 73 is guided in the displacement movement with its circumferential rib 75 in a thread path 77 of the sheath of the seat 9, the perforation operation advantageously takes place with a rotational movement of the piercing spike 37.

Fig. 30 illustrates, in a very schematically simplified depiction, another exemplary embodiment of the key-lock design. In this example, the sheath body forming the seat 9 of the connection device and the body 73 of the transfer device supporting the piercing spike 37 are already premounted on the flask 5, with this opening region 48 not yet being pierced however. The coding of the key-lock system provides for a pin 79 or several pins on the body, which can be introduced into corresponding bores 61, which are formed as a lock on the neck part 8 of the flask 1 in a coded arrangement.

The exemplary embodiment of Figures 31 and 32 provides as a key on the cap part 13 of the flask 5 a pattern of axial bores 83 and a corresponding patter of pins 85 on the support 73 of the piercing spike 37. In the case of corresponding coding of bores 83 and pins 85, the cap part 13 can be contacted against locking parts 87, in order to release the locking of the body 73 on the seat 9, so that said body can be displaced for the connection operation by means of introduction of the flask 5.

The exemplary embodiment of Figures 33 and 34 provides, for the unlocking of the

body 73 supporting the spike 37, a ring 89 made up of flexibly connected pressure bodies 91 which is depicted separately in Fig. 34. By means of the cap part 13 of the flask 5 which can be introduced in the case of corresponding coding, these pressure bodies can be splayed apart in such a way that the surround 93 of the body 73 formed on the flask neck 1 is expanded, as is indicated with the arrows 95, so that the body 73 is released from a step 97 of the surround 93 for the displacement- and opening movement.

The solution according to the invention permits connection of all kinds of media-conducting and media-containing containers which, in the broadest sense, also include hose systems, to one another in a sterile and fluid-tight manner for the purpose of a media exchange.

Claims

1. A container transfer system having at least one first (1) and at least one second container (5), which can be connected to one another in a media-conducting manner by means of a connection device (7), which has a transfer device (27) which, held in a locked position by means of at least one locking device (25), prevents an exchange of media or permits said exchange in at least one unlocked position in which the transfer device (7) is guided in a longitudinally displaceable manner in a seat (9) of the connection device (7) for a transfer operation, with the locking device (25) being able to be transferred to an unlocked position by means of the movement of at least one of the containers (5), **characterized in that** additional control means (13, 21, 31, 81, 83, 85) are provided on the respective mobile container (5) which at least partially surround this container (5) at the external circumference and which activate the locking device (25, 75, 87) of the transfer device (27) for an unlocking.

2. The container transfer system according to Claim 1, characterized in that the additional control means are provided on the outer side of a cap part (13) which, on the mobile container (5), surrounds an opening region (48) which can be perforated by a hollow piercing spike (37) of the transfer device (27), or which, formed by the container (5) itself, are preferably an integral component of the container (5).

3. The container transfer system according to Claim 1 or 2, characterized in that the locking device has a blocking element (25, 67, 73) which, in the locked state, prevents the opening displacement movement of the hollow piercing spike (37) of the transfer device (27) and which can be transferred to

the unlocked state allowing the displacement movement by means of mechanical contact with the control means (13) of the mobile container (5).

4. The container transfer system according to one of the preceding claims, characterized in that, in order to form an encryption which acts as a key-lock system between the mobile container (5) and the connection device (7) as a control means, a key element (13) comprising a physical coding (21, 61, 63) is provided on the mobile container (5) and in that, as the lock of the system, an opening (29) with a physical coding (31) provided on the inner side is provided on the body of the blocking element (25) in such a way that, in the case of corresponding coding, the control means (13) of the container (5) can be introduced into the opening (29) of the blocking element (25) in order to transfer said blocking element to the unlocked state.

5. The container transfer system according to one of the preceding claims, characterized in that the coding (61, 63) of the key element on the cap part (13) of the mobile container (5) has recesses (21, 83) and/or projections (31, 85) provided at the circumference.

6. The container transfer system according to one of the preceding claims, characterized in that the coding of the blocking element (25, 73) is formed by recesses (21, 83) and/or projections (31, 85) which are provided on the wall of its opening (29) and which complement the recesses (21, 83) and/or projections (31, 85) of the mobile container (5) in the case of corresponding coding.

7. The container transfer system according to one of the preceding claims, characterized in that the connection device (7) has, as a seat (9) for the transfer device (27) and the locking device (25), a housing in the form of a

cylindrical sheath, which can be connected or is connected at the one end to a container (1), and is accessible at the other end for a mobile second container (5) and which forms a guide for displacement movements of the transfer device (27) and the locking device (25).

8. The container transfer system according to one of the preceding claims, characterized in that the transfer device (27) has a disk (35, 73) as a support for a centrally located hollow piercing spike (37) projecting on both sides of the disk (35, 73) and in that guide parts (39) for the guiding of the disk (35, 73) in displacement movements in the sheath are provided at the circumference of the disk (35,73) as are locking elements (41, 43, 49) which can be activated by means of the locking device (25, 87).

9. The container transfer system according to one of the preceding claims, characterized in that, at the circumference of the disk (35,73), first locking elements (41, 49) are provided, by means of which, in a start position, the disk (35, 73) is detachably latchable on catches (51) of the sheath against an opening displacement movement, and second locking elements (43, 45) are also provided which, in their normal blocking position, hold the blocking element (25) in the locked state and which, by means of contact with the control means (13) of the mobile container (5) introduced into the blocking element (25), can be controlled out of the blocking position into an unblocked position, in which they transfer the blocking element (25) into the unlocked state (35, 73).

10. The container transfer system according to one of the preceding claims, characterized in that first (49) and second locking elements (43, 45) are formed on tongue parts, which can move in a flexible manner relative to one another, of tabs provided at the circumference of the disk (35) which are

raised from the plane.

11. The container transfer system according to one of the preceding claims, characterized in that the respective tab for the respective second locking element (43, 45) has a control part (53) which engages in the opening (29) of the blocking element (25) which, by means of contact with the control means (13) of the mobile container (5) introduced into the opening (29), moves the respective second locking element (43, 45) out of the blocking position and unlocks the blocking element (25).

12. The container transfer system according to one of the preceding claims, characterized in that the blocking element (25) in the unlocked state can be moved by means of the mobile container (5) towards the disk (35) of the transfer device (27), with the tabs being guided in control channels (55) of the blocking element (25) in such a way that the tongue parts (41, 49) forming the latching to the sheath are moved in an unlatching manner in the control channels (55), so that the transfer device (27) is free for the opening displacement movement and can be carried along by means of the movement of the blocking element (25).

13. The container transfer system according to one of the preceding claims, characterized in that, for the tongue parts (41, 49) forming the latching to the sheath, second catches (57) are formed on the sheath, which latch the transfer device (27) in an end position at the end of a connection operation.

14. The container transfer system according to one of the preceding claims, characterized in that, at the circumference of the disk (35, 73) of the transfer device (27), inwards projecting detents (47) are provided, which, in the end position of the transfer device (27), form a snap connection with

a circumferential edge (19) of the key element-comprising cap part (13) of the mobile container (5).

15. The container transfer system according to one of the preceding claims, characterized in that the latching of the disk-shaped support (73) of the piercing spike (37) takes place with the help of locking parts (87) which are spring-mounted in the sheath (9).