of the gaseous components into the container envelope takes a comparatively disproportionate amount of time, in particular towards the end of the filling procedure.

It is therefore the object of the present invention, to suggest a cleaning method and an associated cleaning device of the type described above, which permits a more rapid introduction of a defined quantity of gaseous starting components. In particular, the filling of a container envelope should be quicker due to this.

According to a further object, the cleaning method and the associated cleaning device should permit the gaseous components to be introduced in a stoichiometric quantity ratio with comparatively little effort with regard to control technology. Stoichiometric quantity ratio means that the reactants are fed in quantity ratios of a reaction, such that none of the reactants is present is excess. Accordingly, the computation of the stoichiometric quantity ratio is effected on the basis of the associated reaction equation.

The object is achieved by the features of the independent claims 1 and 10. Further developments and particular embodiments of the invention are to be deduced from the dependent claims, the description and the drawings. Thereby, features of the method claims, with regard to context can be combined with the device claims and vice versa.

The cleaning device according to the invention in particular comprises:

- a cleaning apparatus with a receiving space for providing an explosive, gaseous mixture from one or with at least one gaseous component;
- at least one pressure container which is connected to the cleaning apparatus and is for providing and introducing the at least one gaseous component into the cleaning apparatus;
- at least one metering fitting for the metered introduction of the at least one gaseous component out of the at least one pressure container, into the cleaning apparatus;
- an ignition device for igniting the explosive, gaseous mixture as well as
- a control device for the control of the at least one metering fitting and the ignition of the explosive mixture.

The pressure container in particular is connected to the cleaning apparatus via a feed conduit.

The pressure container or containers in particular is/are metering containers for metering the quantity of gaseous component which is to be introduced into the cleaning apparatus.

The cleaning device in particular also comprises at least one pressure sensor for measuring the pressure in the at least one pressure container.

The cleaning device is characterised in that this comprises means for optimising the introduction of the at least one gaseous component out of the pressure container into the cleaning apparatus, wherein the means comprises:

- the control device which is designed for the control of the at least one metering fitting, in dependence on pressure measurement values in the pressure container which are detected by way of at least one pressure sensor, in a manner such that the control device is in the position of ending the introduction of the at least one gaseous component out of the at least one pressure container into the cleaning apparatus, as soon as the measured pressure in the pressure container corresponds to a nominal residual pressure which lies in an overpressure region, or
- one of an expulsion device or a displacement element which separates a storage space from a compensation storage for size reduction of the storage space in the pressure container during the introduction of the at least one gaseous component into the cleaning apparatus.

The optimisation of the introduction in particular includes the increase of the average introduction speed of the at least one gaseous components out of the pressure container into the cleaning apparatus.

The storage space corresponds to that space in the pressure container, which receives the gaseous component subjected to pressure and to be introduced into the cleaning apparatus.

The at least one metering fitting in particular is connected to the control device via a control lead. The at least one pressure sensor in particular is connected to the control device via a data lead.

The method according to the invention in particular has the following method steps:

- providing at least one gaseous component in the pressure container at overpressure;
- introducing the at least one gaseous component from the pressure container into the cleaning apparatus via the metering fitting;
- providing an explosive, gaseous mixture in the receiving space, comprising or consisting of the at least one introduced gaseous component; as well as
- igniting the explosive, gaseous mixture.

The introduction of the at least one gaseous component from the pressure container into the cleaning apparatus in particular is effected via a feed conduit.

The method is characterised in that the introduction of the at least one gaseous component out of the pressure container into the cleaning apparatus is optimised by way of:

- the control of the introduction of the at least one gaseous component into the cleaning apparatus being effected according to the principle of the differential pressure between a maximal pressure at the beginning of the introduction and a nominal residual pressure after the completion of the introduction, wherein the nominal residual pressure lies in the overpressure region, or
- a storage space in the at least one pressure container is reduced in size during the introduction of the at least one gaseous component into the cleaning apparatus by means of

an expulsion device or a displacement element which separates the storage space from a compensation storage.

According to the differential pressure method, the nominal residual pressure is ascertained, based on the known maximum pressure, in particular on the basis of the quantity of gaseous component which is to be introduced. The introduction of the at least one gaseous component is stopped on reaching the nominal residual pressure. In this manner, the average introduction speed is increased compared to conventional methods, since the introduction speed on reaching a nominal residual pressure is greater than at the end of the emptying of the pressure container.

With regard to the overpressure, it is the case of that pressure value which results from the difference between the pressure prevailing in the pressure container and the prevailing ambient pressure. The ambient pressure in particular is the pressure prevailing outside the pressure container. The ambient pressure for example is the atmospheric pressure. This means that the pressure container or containers are not emptied to the ambient pressure.

The maximal pressure corresponds to the pressure in the pressure container at the beginning of the introduction. The maximal pressure in particular is defined likewise. The pressure containers are thus likewise filled beforehand with the gaseous starting component until reaching the predefined maximal pressure, by way of the control device.

According to a particular embodiment variant of the invention, the cleaning apparatus is designed for attaching a container envelope which can be filled with an explosive, gaseous mixture.

The method belonging to this embodiment variant has the following method steps:

- attaching a container envelope on the cleaning apparatus;
- providing the at least one gaseous component in the pressure container at overpressure;

PATENT CLAIMS

1. A method for removing deposits in interiors of receptacles and installations (51), with a cleaning device (1, 101) by way of explosion technology, wherein the cleaning device (1, 101) comprises a cleaning apparatus (2, 102) with a receiving space (11, 111), and at least one pressure container (21, 21'; 121, 121') which is connected to the cleaning apparatus (2, 102) via at least one metering fitting (18, 18', 118, 118'), with the following steps:

- providing at least one gaseous component in the pressure container (21, 21'; 121, 121') at overpressure;
- introducing the at least one gaseous component from the pressure container (21, 21'; 121, 121') into the cleaning apparatus (2, 102) via the metering fitting (18, 18', 118, 118');
- providing an explosive, gaseous mixture in the receiving space (11, 111), comprising or consisting of the at least one introduced gaseous component;
- igniting the explosive, gaseous mixture,

characterised in that

for optimising the introduction of the at least one gaseous component out of the pressure container into the cleaning apparatus:

- the control of the introduction of the at least one gaseous component into the cleaning apparatus (2, 102) is effected according to the principle of the differential pressure between a maximal pressure at the beginning of the introduction and a nominal residual pressure after the completion of the introduction, wherein the nominal residual pressure lies in the overpressure region, or
- a storage space in the at least one pressure container is reduced in size during the introduction of the at least one gaseous component into the cleaning apparatus by means of

an expulsion device or a displacement element which separates the storage space from a compensation storage.

2. A method according to claim 1, characterised in that, based on the maximal pressure, the nominal residual pressure is ascertained on the basis of the quantity of gaseous component which is to be introduced, and the introduction of the at least one gaseous component is stopped on reaching the nominal residual pressure.

3. A method according to claim 1 or 2, characterised in that the cleaning apparatus (2 , 102) is designed for the attachment of a container envelope (29) which can be filled with the explosive, gaseous mixture, with the following steps:

- attaching a container envelope (29) on the cleaning apparatus (2, 102);

10. A cleaning device (1, 101) for removing deposits in interiors (54) of receptacles or installations (51) by way of explosion technology, in particular for carrying out the method according to the claims 1 to 9, comprising:

- a cleaning apparatus (2, 102) with a receiving space (11, 111) for providing an explosive, gaseous mixture from one or with at least one gaseous component;
- at least one pressure container (21, 21'; 121, 121') which is connected to the cleaning apparatus (2, 102) and is for providing and introducing the at least one gaseous component into the cleaning apparatus (2, 102);
- at least one metering fitting (18, 18'; 118, 118') for the metered introduction of the at least one gaseous component out of the at least one pressure container (21, 21'; 121, 121'), into the cleaning apparatus (2, 102);
- an ignition device (13, 113) for igniting the explosive, gaseous mixture;
- a control device (3, 103) for the control of the at least one metering fitting (18, 18'; 118, 118') and for the ignition of the explosive mixture,

characterised in that

the cleaning device (1, 101) comprises means for optimising the introduction of the at least one gaseous component out of the pressure container (21, 21'; 121, 121') into the cleaning apparatus (2, 1012), wherein the means comprise:

- the control device (3, 103) which is designed for the control of the at least one metering fitting (18, 18'; 118, 118') in dependence on pressure measurement values which are detected by way of at least one pressure sensor (17, 17'; 117, 117') in the pressure container (21, 21'; 121, 121'), in a manner such that the control device (3, 103) is in the position of ending the introduction of the at least one gaseous component out of the at least one pressure container (21, 21'; 121, 121') into the cleaning apparatus (2, 102), as soon as the measured pressure in the pressure container (21, 21'; 121, 121') corresponds to a nominal residual pressure which lies in an overpressure region, or
- one of an expulsion device or a displacement element which separates a storage space from

a compensation storage for size reduction of the storage space in the pressure container during the introduction of the at least one gaseous component into the cleaning apparatus.

11. A cleaning device according to claim 10, characterised in that the cleaning apparatus (2, 102) is designed for attaching a container envelope (29) which is fillable with an explosive, gaseous mixture.

12. A cleaning device according to claim 10 or 11, characterised in that the cleaning device (1, 101) comprises a first pressure container (21, 121) and a first metering fitting (18, 118) for