Patent claims

1. Dispensing device having
- a linear drive for relatively moving a reaction vessel unit along a dispensing unit with at least two dispensing heads, each of which has a plurality of dispensing nozzles, so that a reaction vessel unit can be arranged under the dispensing nozzles of the dispensing unit in order to fill reaction vessels of the reaction vessel unit,
- pumps, which are each connected to one of the dispensing heads by a liquid line in order to convey a liquid reagent to the respective dispensing head,
wherein a pump valve with a first and a second inlet and an outlet is arranged upstream of each of the pumps, wherein the outlet can be connected to the respective pump, the first inlet to a common reagent stock and the second inlet in each case to an individual reagent stock.

2. Dispensing device according to claim 1, characterised in that a distributor arrangement with one inlet and several outlets is arranged between the common reagent stock and the pump valves, wherein each second inlet of the respective pump valve is connected to an outlet of the distributor arrangement.

3. Dispensing device according to claim 1 or 2, characterised in that the common reagent stock has a valve arrangement with a plurality of inlets and one outlet,
wherein the outlet of this valve arrangement is connected to one or more of the first inlets of the pump valves and a reagent storage container can be coupled to each of the inlets of the valve arrangement.

4. Dispensing device according to one of claims 1 to 3, characterised in that the second inlets of the pump valves can each be coupled directly to a reagent storage container.

5. Dispensing device according to one of claims 1 to 4, characterised in that a shut off valve is arranged between the pumps and the respective dispensing head.

6. Dispensing device according to one of claims 1 to 5, characterised in that the liquid lines between the pumps and the respective dispensing heads have a smaller cross-section than liquid lines leading from the pumps to the reagent storage containers.

7. Dispensing device according to one of claims 1 to 6, characterised in that the dispensing heads can be detachably coupled to one another and/or that the dispensing heads are interchangeably arranged.

8. Dispensing device according to one of claims 1 to 7, characterised in that the dispensing heads each have a plurality of nozzles arranged in series,
wherein each dispensing head has one or more rows of nozzles and the rows of nozzles each comprise the same number of nozzles or a different number of nozzles.

9. Dispensing device according to one of claims 1 to 8, characterised in that the dispensing heads can be coupled to one another in a form-fit manner.

10. Dispensing device according to one of claims 1 to 9, characterised in that a temperature control device is provided for controlling the temperature of a reagent to be supplied to the dispensing head.

11. Dispensing device according to claim 10, characterised in that the temperature control device is designed to control the temperature of a section of the liquid line and/or to control the temperature of at least one of the pumps.

12. Dispensing device according to one of claims 1 to 11, characterised in that a liquid line leading from one of the individual reagent stocks to the respective dispensing head is no longer than 40 cm, in particular no longer than 30 cm and preferably no longer than 20 cm.

13. Dispensing device according to one of claims 1 to 12, characterised in that a collecting basin for collecting liquid reagents dispensed with the dispensing nozzles is arranged in the region below the dispensing heads.

14. Centrifuge with a rotor and a rotor chamber in which the rotor is arranged and rotatably mounted, wherein the rotor has a reception area for receiving the reaction vessel unit, and the rotor chamber is bounded by a housing,
characterised in that the centrifuge has a dispensing device according to one of claims 1 to 13.

15. Method for cleaning dispensing nozzles, in particular dispensing nozzles of a dispensing device according to one of claims 1 to 13 or of a centrifuge according to claim 14,
wherein the dispensing nozzles are arranged on at least two different dispensing heads and reagents are dosed to each dispensing head with a respective pump and using a pump valve arranged upstream of the pump and having a first inlet and a second inlet, and an outlet,
wherein the outlet is connected to the pump, the first inlet is connected to a common stock of cleaning solution and the second inlet is each connected to an individual reagent stock containing the respective reagent, so that the wash solution for rinsing the dispensing nozzles is supplied to the respective dispensing heads as required by means of the pump valves.

16. A cleaning adapter for a dispensing head having one or more dispensing nozzles for dispensing a liquid reagent via at least one nozzle,
wherein the cleaning adapter has a trough-shaped adapter body with a bottom wall, two longitudinal side walls and two end walls, which define an upwardly pointing opening,
wherein the upwardly pointing opening is adapted to the contour of the dispensing head in such a way that the cleaning adapter can be attached to the dispensing head at the region where the dispensing nozzles protrude in such a way that the cleaning adapter lies essentially fluid-tight against the dispensing head,
a through cleaning opening is formed in the bottom wall for each dispensing nozzle of the dispensing head, so that when the cleaning adapter is attached to the dispensing head, one of the dispensing nozzles extends through one of the through openings in each case, the dispensing nozzles being arranged in the cleaning openings with some play in each case, and
the cleaning adapter has at least one connection opening with a connection element for connecting a line for supplying or discharging a cleaning fluid.

17. Cleaning adapter according to claim 16, characterised in that the cleaning adapter has at least two connection openings, which are preferably arranged diametrically opposite each other on the end walls.

18. Cleaning adapter according to claim 16 or 17, characterised in that an elastic sealing element is provided in the region of the upwardly pointing opening for sealing the cleaning adapter with respect to the dispensing head.

19. Cleaning adapter according to one of claims 16 to 18, characterised in that it comprises fixing elements for fixing the cleaning adapter to the dispensing head and/or to a dispensing device comprising the dispensing head.

20. Dispensing head with one or more dispensing nozzles for dispensing a liquid reagent via the at least one dispensing nozzle, characterised in that it has a cleaning adapter according to one of claims 16 to 19.

21. Dispensing head according to claim 20, characterised in that the cleaning adapter is integrally formed on the dispensing head.

22. Dispensing device comprising
- a dispensing head having at least one dispensing nozzle for dispensing a liquid reagent via the at least one dispensing nozzle, wherein the dispensing device comprises a cleaning adapter according to one of claims 16 to 19 and/or a dispensing head according to claim 20 or 21 and is provided with a pump which is connected to the cleaning connection by a fluid line for supplying or removing a cleaning fluid to or from the cleaning adapter.

23. Method for cleaning one or more dispensing nozzles of a dispensing device according to claim 22, characterised in that a cleaning fluid is either
- supplied exclusively to the cleaning adapter, so that the dispensing nozzle(s) is/are rinsed with the cleaning fluid, or
- is drawn off exclusively from the cleaning adapter so that droplets on the dispensing nozzles are drawn into the cleaning adapter, or

- is simultaneously fed to the cleaning adapter via one connection opening and drawn off via another connection opening so that the cleaning adapter is rinsed.

24. Method according to claim 23, characterised in that the cleaning fluid is one or a mixture of the following fluids:

- air
- alcohols
-Aqueous solution, especially with surfactants.
-acid, e.g. citric acid, acetic acid.
-base, such as caustic soda (NaOH), caustic potash (KOH), sodium hypochlorite.