CLAIMS

1. A machine for preparing intravenous medicaments comprising an enclosing structure (11) having a plurality of lateral walls which define the sides of a closed internal working environment, at least one access station (12) being provided on at least one lateral wall of the enclosing structure (11) for the selective access to the closed internal working environment, at least one wall of the lateral walls being an equipped wall (24) which groups together the machinery which is provided for preparing the intravenous medicaments, each of the at least one equipped wall being provided with a plurality of stations for one or more objects (F, A, B, S) which can be used in the preparation of intravenous medicaments, the plurality of stations comprising:

- at least one temporary receiving or parking station (26, 27, 28, 30) which is provided for temporarily receiving one or more of the objects (F, A, B, S), and
- at least one operating station (31, 34, 42) which is provided for carrying out operations on one or more of the objects (F, A, B, S) for preparing intravenous medicaments,
- a preparation station (32), arranged in a substantially central zone of the equipped wall (24), suitable for using intravenous medicaments,

wherein the at least one temporary receiving or parking station (26, 27, 28, 30) and at least one operating station (31, 34, 42) are provided on each equipped wall (24) of the lateral walls, the machine further comprising a handling robot (20) which is arranged in the closed internal space of the machine, the handling robot (20) being programmed to transfer the objects (F, A, B, S) from any station which is selected from at least one access station (12), at least one temporary receiving station (26, 27, 28, 30) and at least one operating

station (31, 34, 42), to any other of those stations (12, 26, 27, 28, 30, 31, 34, 42).

2. A machine for preparing intravenous medicaments according to claim 1, wherein each equipped wall is provided with a metering module (100) that comprises a single syringe support/metering member group (103), which is arranged on the equipped wall (101) in a substantially central position, wherein all the operations on the objects stored thereon can also be carried out without the intervention of a handling robot or an external operator.

3. A machine for preparing intravenous medicaments according to claim 1, wherein the preparation station (32), comprising a syringe support (40), which support is provided with an engaging member (42) for a syringe (S), and wherein the syringe support (40) comprises a syringe actuator (44) which is capable of selectively moving forwards or backwards the plunger of a syringe (S) gripped by the engaging member (42) so as to operate the syringe (S) in a drawing or injecting manner, the syringe support being mounted on a rotary platform (134) which is actuated by a motor group (132) which allows it to rotate in the vertical plane of the equipped wall (101) so as to turn from time to time towards various groups which radially surround it and wherein all the operations on the objects stored thereon can also be carried out without the intervention of a handling robot or an external operator.

4. A machine for preparing intravenous medicaments according to claim 1, wherein the handling robot (20) is arranged in a substantially central position in the closed internal working environment, the handling robot (20) comprising a handling hand (23) and being able to rotate about a substantially vertical axis so as to be able substantially to reach with the

handling hand (23) any position on the lateral walls of the enclosing structure (11).

5. A machine according to either claim 1 or claim 4, wherein the at least one equipped wall (24) comprises:
- at least one bottle parking station (26) for bottles (F) or the like,
- at least one ampoule parking station (27) for ampoules or phials (A) or the like,
- at least one syringe parking station (28) for syringes (S) or the like,
- at least one bag parking station (30) for bags (B) or the like.

6. A machine according to claim 1, wherein bottle work supports (31) are arranged around the preparation station (32).

7. A machine according to any one of the preceding claims, wherein there is arranged below the preparation station (32) a weighing device (33) which is capable of weighing a bag (B) and/or a bottle (F).

8. A machine according to any one of the preceding claims, wherein the preparation station (32) comprises a syringe support (40) which can rotate about an axis which is substantially horizontal and movable in a substantially vertical direction, which support is provided with an engaging member (42) for a syringe (S).

9. A machine according to claim 8, wherein the syringe support (40) comprises a syringe actuator (44) which is capable of selectively moving forwards or backwards the plunger of a syringe (S) gripped by the engaging member (42) so as to operate the syringe (S) in a drawing or injecting manner.

10. A machine according to any one of the preceding claims, wherein there are arranged on the at least one equipped wall (24) one or more mixers (34) which are capable of mixing the contents of one or more corresponding bottles (F).

11. A machine according to any one of the preceding claims, wherein the access station (12) is constructed in the form of a transit chamber which is constructed so as not to directly expose to the exterior the environment internal with respect to the machine.

12. A machine according to claim 11, wherein the transit chamber has two closure panels or doors, one directed towards the outer side of the enclosing structure (11) so as to be accessible to an operator in order to introduce or withdraw contents to/from the transit chamber, and the other directed towards the internal working environment of the machine for removing or depositing contents by the handling robot (20).

13. A machine according to any one of the preceding claims, wherein there can be inserted in the access station (12) at least one tray (17) which is provided with specific receiving members (18) for the objects (F, A, B, S) which are suitable for preparing the intravenous medicaments.

14. A machine according to claim 13, wherein the at least one tray (17) comprises at least one receiving member (18) which comprises a cavity with at least two mutually different internal diameters so as to be able to receive cylindrical objects with corresponding different basic diameters which substantially correspond to the different internal diameters of the cavity.

15. A machine according to claim 13 or 14, wherein the at least one tray (17) further has at least one specific receiving member (19) for syringes (S) or the like.

16. A machine according to any one of the preceding claims, provided with a system for regulating the air inside the enclosing structure (11) in order to maintain environmental conditions which are ideal for preparing the intravenous medicaments, at the same time preventing discharges of powders or other products which are dangerous to the health of the operators, or minimizing the introduction of contaminants in the enclosing structure (11).

17. A machine according to claim 16, wherein the internal working environment is maintained at a negative pressure in order to prevent the discharge of noxious or toxic products being processed therein.

18. A machine according to claim 16, wherein the internal working environment is maintained at a positive pressure in order to prevent the introduction of contaminants into the enclosing structure (11).

19. A machine according to any one of claims 1 to 18, comprising a metering module for preparing intravenous medicaments, forming at least one of the lateral, equipped walls the metering module comprising one or more container support groups (102), at least one syringe support/metering member group (103), and at least one weighing group (105, 106) for weighing objects used in the preparation of intravenous medicaments.

20. A machine according to claim 19, wherein the metering module further comprises at least one needle unscrewing and/or syringe plugging group (104).

21. A machine according to claim 19 or claim 21, wherein the metering module further comprises at least one washing station (108).

22. A machine according to any one of claims 19 to 21, wherein the metering module further comprises one or more baskets or the like for collecting objects which are allowed to fall by one of the container support groups (102) and/or by a syringe support/metering member group (103).

23. A machine according to any one of claims 21 to 22, wherein the weighing group (105, 106) comprises at least one syringe weighing group (105) and/or at least one bag weighing group (106).

24. A machine according to any one of claims 19 to 23, wherein the metering module further comprises a single syringe support/metering member group (103) which is arranged in a substantially central position and which is surrounded radially by some container support groups (102), by a needle unscrewing and/or syringe plugging group (104), by a syringe weighing group (105) and – in a lower position – by a bag weighing group (106), the syringe support/metering member group (103) being mounted on a rotating platform (110) which is actuated by a motor group (111) which allows it to rotate in a vertical plane so as to turn from time to time to the various groups which radially surround it.

25. A machine according to any one of claims 19 to 24, wherein the container support group (102) comprises a plurality of pairs of pincers (120) which are arranged so as to rotate about a substantially horizontal axis (X-X).

26. A machine according to any one of claims 19 to 25, wherein the syringe support/metering member group (103) comprises a base support (130) which can rotate about a first substantially horizontal axis (X-X) and which is movable in translation along an axis transverse to the first axis (X-X).

27. A machine according to claim 26, wherein the syringe support/metering member group (103) comprises a pair of pincers (139) for clamping a syringe body, a pair of pincers (141) for clamping a syringe needle and a pair of pincers (145) for clamping a syringe plunger, each of them being linearly movable.

28. A machine according to any one of claims 20 to 27, wherein the needle unscrewing and/or syringe plugging group (104) comprises an operating member (151) which has a receiving member (152) for receiving and gripping a member, the operating member (151) being selectively rotatable and being associated with a translation member (157) in order to press a cover on a syringe or to extract a needle from a syringe.

29. A machine according to any one of claims 19 to 28, wherein the at least one weighing group comprises a syringe weighing group (105) with an engaging element (160) which is resiliently loaded in order to grip a member to be weighed, a motor member (164) being arranged to loosen the engaging member (160) by acting counter to the resilient loading action and further being able to be disengaged from the engaging member (160) in order to isolate a balance (162) which is connected to the engaging member (160) so as not to affect the measurement.

30. A machine according to any one of claims 19 to 29, wherein the at least one weighing group comprises a bag weighing group (106) with a bag support (170) which is connected to a balance

(174) and which can be lifted selectively into abutment with a projecting member (176) which acts as an abutment and as a fixed reference.

31. A process for preparing intravenous medicaments by means of a machine according to any one of claims 1 to 18, comprising the implementation of the following steps asynchronously:

- introduction of containers (F, A, B, S) inside the machine;
- removal of containers from the machine;
- transfer of containers (F, A, B, S) from a predetermined station to another predetermined station, which is carried out by the single handling robot (20);
- subjecting the containers (F, A, B, S) to operations for preparing intravenous medicaments which are carried out without the use of the handling robot (20) on each of the at least one equipped walls (22).