CLAIMS

1. Separator insert for a separator, which is designed for separating a flowable suspension ~~(S)~~ into at least two flowable phases ~~(LP, HP)~~ of different density in a centrifugal field, comprising:
   a) a housing ~~(1)~~ which is stationary during operation and which is designed in the form of a container which is closed except apart from multiple openings, wherein these openings are designed as follows: as a supply opening ~~(8)~~ for an inflowing suspension in a first axial boundary wall ~~(6)~~ of the housing ~~(1)~~, as two outlets ~~(10, 11)~~ for flowable phases of differing density ~~(LP, HP)~~ in an outer casing of the housing ~~(1)~~, and as a recirculation inlet ~~(9)~~ in a second axial boundary wall ~~(7)~~ of the housing ~~(1)~~,
   b) a rotor ~~(2)~~ arranged within the housing ~~(1)~~ and which can rotate about an axis of rotation ~~(D)~~ and having a drum ~~(3)~~, which also has multiple openings, wherein one or more first and one or more first second openings ~~(12a, 32a, 21, 22)~~ of the drum ~~(3)~~ serve as free radial outlets ~~(21, 22)~~ for the light and the heavy phase ~~(LP, HP)~~ into the housing ~~(1)~~, and wherein into two further ones of the openings ~~(12a, 22a)~~ of the drum at the two axial ends of the drum ~~(3)~~ a feed pipe ~~(12, 32)~~ extends in each case, which does not touch the drum ~~(3)~~,
   c) wherein a separation means is arranged in the drum ~~(3)~~,
   d) at least two rotor units ~~(4b, 5b)~~ for magnetic bearing devices ~~(4, 5)~~ at two axially spaced-apart points on the rotor ~~(2)~~ with the drum ~~(3)~~, with which the rotor ~~(2)~~ with the drum ~~(3)~~ can be held in a suspended state, can be rotatably mounted and can be made to rotate within the housing during operation.

2. Separator insert according to claim 1, characterized in that the separator insert ~~(II)~~ forms a pre-assembled, exchangeable unit for insertion into a frame ~~(I)~~ of the separator.

3. Separator insert according to claim 1 or 2, characterized in that the housing ~~(1)~~ and the drum ~~(3)~~ are made entirely or predominantly of plastic or a plastic composite material.

4. Separator insert according to claim 1, 2 or 3, characterized in that the rotor units ~~(4b, 5b)~~ for the magnetic bearing devices ~~(4, 5)~~ are arranged at the two axial ends of the drum ~~(3)~~, and in that each of the feed pipes ~~(12, 32)~~ passes axially through one of the rotor units ~~(4b, 5b)~~.

5. Separator insert according to claim 4, characterized in that one or both of the magnetic bearing devices (4, 5) can also be used for rotating and for adjusting the speed of the drum, and in that one or both of the magnetic bearing devices (4, 5) act in a radially and axially bearing manner and keep the rotor (2) suspended in the drum (1) at a distance from the latter during operation.

6. Separator insert according to one of the preceding claims, characterized in that each of the two outlets (10, 11) for flowable phases of different density (LP, HP) is associated with a respective trapping ring chamber (23, 24) of the housing (1).

7. Separator insert according to one of the preceding claims, characterized in that the two outlets (10, 11) for flowable phases of different density (LP, HP) are formed radially or tangentially on the housing (1).

8. Separator insert according to one of the preceding claims, characterized in that the inlet (8) is formed by the first, non-rotatable feed pipe (12), which projects with one end out of the housing (1) to a first side, in particular with vertical alignment of the axis of rotation (D) upwards, and outwards, and which extends through the first axial boundary wall (6) and through the one magnetic bearing (4) axially into the drum (3), but does not touch the latter in the process.

9. Separator insert according to one of the preceding claims, characterized in that the first feed pipe (12) passes through the housing (1) concentrically to the axis of rotation of the rotor (2), then extends axially further within the housing (1) into the rotatable drum (3) and ends there with its other end - a free outlet end - in front of or in a distributor (13) which is arranged in the drum (3) and rotates with the latter and by means of which the suspension can be conducted into the centrifugal chamber.

10. Separator insert according to one of the preceding claims, characterized in that the drum (3) has at least two sections (18, 19) of different diameter and in that, for discharging the differently dense phases (LP, HP) from the drum (3) in the sections of different diameter, at least one or more outlets (21, 22) are provided in each case in the outer casing of the drum (3), which outlets each have one or more of the openings, in particular nozzle-like openings, in the drum outer casing (3) and thus form the free outlets (21, 22) into the respective trapping ring chambers (23, 24).

11. Separator insert according to one of the preceding claims, characterized in that the respective outlet (10, 11) for the respective light or heavier phase (LP or HP) is formed at the lowest point of the respective trapping ring chamber (24, 25).

12. Separator insert according to one of the preceding claims, characterized in that the light or heavy phase ~~(LP, HP)~~ emerging from one of the two outlets ~~(10 or 11)~~ can be conveyed away from the housing ~~(1)~~ by a discharge line ~~(29)~~ with a pump ~~(28)~~, and in that a branch line ~~(30)~~ is provided which opens into the recirculation inlet ~~(9)~~, so that a recirculation line is formed for returning the light or the heavy phase ~~(LP, HP)~~ to the drum.

13. Separator insert according to one of the preceding claims, characterized in that the light or heavier phase ~~(HP)~~ to be recirculated can be pumped into the drum ~~(3)~~ by the pump ~~(28)~~.

14. Separator insert according to one of the preceding claims, characterized in that the recirculation inlet ~~(9)~~ comprises the second feed pipe ~~(32)~~ passing through a second axial boundary wall ~~(7)~~ of the housing ~~(1)~~ and opening into a second distributor ~~(33)~~ in the drum ~~(3)~~ not rotating with the drum ~~(3)~~.

15. Separator insert according to one of the preceding claims, characterized in that a controllable regulating valve ~~(31)~~ is provided, with which the recirculation inlet ~~(9)~~ can be shut off or opened completely or partially.

16. Separator insert according to one of the preceding claims, characterized in that at least one measuring device is provided with which a parameter of the light phase ~~(LP)~~ and/or the heavy phase ~~(HP)~~ can be determined.

17. Separator insert according to one of the preceding claims, characterized in that a stack of separator disks ~~(17)~~ is inserted into the drum ~~(3)~~ as the separation means.

18. Separator insert according to one of the preceding claims, characterized in that all of its components are assembled into the pre-assembled unit, wherein all of the product-contacting elements are made of plastic or other non-magnetic material.

19. Separator insert according to one of the preceding claims, characterized in that its feed pipes ~~(12, 32)~~ and its outlets ~~(10, 11)~~ project outwardly from the housing ~~(1)~~ in the manner of nozzles, wherein these nozzles are connected to the housing ~~(1)~~ in a sealed manner or are formed integrally therewith.

20. Separator insert according to one of the preceding claims, characterized in that the housing is of hermetically sealed design except for the openings with the feed pipes ~~(12, 32)~~ and the outlets ~~(10, 11)~~.

21. Separator having a frame ~~(I)~~ and a separator insert ~~(II)~~ according to one of the preceding claims which is exchangeably arranged on the frame.

22. Separator according to claim 21, characterized in that on it are formed spaced-apart receptacles ~~(I-4, I-5)~~ with stator units ~~(4a, 5a)~~ of the bearing devices ~~(4, 5)~~, between which the separator insert ~~(II)~~ can be inserted in a rotationally fixed and exchangeable manner.

23. Separator according to claim 22, characterized in that the relative distance of the receptacles ~~(I-4 and I-5)~~ with the stator units ~~(4a, 5a)~~ of the bearing means ~~(4, 5)~~ is adjustable in order to exchange the separator insert ~~(II)~~.

24. Separator according to claim 22 or 23, characterized in that the housing ~~(1)~~ of the separator insert ~~(II)~~ can be fastened to the frame ~~(I)~~ in a form-fitted and/or force-fitted rotationally fixed manner.

25. Separator according to claim 23, characterized in that the housing ~~(1)~~ and at least one receptacle ~~(I-4 or I-5)~~, preferably the receptacles ~~(I-4 and I-5)~~, and at least one stator unit, preferably the stator units ~~(4a, 5a)~~, comprise corresponding form-fitting means ~~(41a, 41b)~~ for retaining the housing ~~(1)~~ in a rotationally fixed manner on the receptacle or receptacles ~~(I-4 and/or I-5)~~.

26. Separator according to one of the preceding claims, characterized in that at least one control device is provided with which the amount of recirculation of the light or the heavy phase ~~(LP, HP)~~ is controlled or regulated, in particular by using one or more results of measurements with the measuring device.