CLAIMS

1. A rotary machine (**1**) for sorting a mixture of wastes (**2**), the latter being of heterogeneous sizes, shapes and consistencies, the mixture of wastes (**2**) comprising at least biodegradable wastes and non-biodegradable recyclable wastes, said sorting machine (**1**) comprising:

one first trommel section (**3**), provided with a first separation wall (**5**) extending over a first axial length (L**1**) and being provided with a first series of separation through orifices (**7**, **8**) allowing separating the mixture of wastes (**2**) into a first fraction of wastes (**13**) getting through said first separation wall (**5**) via the first series of separation orifices (**7**, **8**) and into a residual second fraction of wastes (**14**), the mixture of wastes (**2**) being intended to circulate along said first wall so as to be separated, wherein the first separation wall (**5**) has a first shape selected from the group consisting of a prism, a cylinder and a truncated cone, a height of the first shape defining a first longitudinal axis (X-X′) of the first separation wall (**5**), the first separation wall (**5**) being rotated around the first longitudinal axis (X-X′); and

one second trommel section (**4**), provided with a second separation wall (**6**) extending over a second axial length (L**2**) smaller than the first length (L**1**), said second separation wall (**6**) being provided with a second series of separation through orifices (**9**) allowing separating the residual second fraction of wastes (**14**) into a subfraction of small-sized wastes (**15**) getting through said second separation wall (**6**) via said second series of separation orifices (**9**) and into a residual subfraction of large-sized wastes (**16**), the subfraction of large-sized wastes (**16**) being formed by wastes the size of which is larger than the subfraction of small-sized wastes (**15**), the residual second fraction of wastes (**14**) being intended to circulate along said second wall so as to be separated, wherein the second separation wall (**6**) has a second shape selected from the group consisting of a prism, a cylinder and a truncated cone, a height of the second shape defining a second longitudinal axis (Y-Y′) of the second separation wall (**6**), the second separation wall (**6**) being rotated around the second longitudinal axis (Y-Y′).

2. The sorting machine (**1**) according to claim 1, characterized in that the first length (L**1**) is at least equal to 1.05 times the second length (L**2**), preferably at least 1.10 times, still more preferably at least 1.12 times.

3. The sorting machine (**1**) according to claim 1, characterized in that the sum of the first length (L**1**) and of the second length (L**2**) ranges from 10 to 20 m, and that the sorting machine (**1**) is designed to sort between 10 and 50 T/hr of a mixture of wastes (**2**).

4. The machine (**1**) for sorting a mixture of wastes (**2**) according to claim 1, characterized in that the first series of separation orifices (**7**, **8**) comprises at least primary orifices (**7**) enabling at least contributing to the separation of the mixture of wastes (**2**) into the first fraction of wastes (**13**) and into the residual second fraction of wastes (**14**) by passage of the first fraction of wastes (**13**) throughout said primary orifices (**7**), the latter having a size adapted to prevent the passage of wastes with a size larger than 80 mm.

5. The machine (**1**) for sorting a mixture of wastes (**2**) according to claim 1, characterized in that the section of the primary orifices (**7**) is circular, with a diameter comprised between 85 mm and 95 mm, preferably about 90 mm.

6. The machine (**1**) for sorting a mixture of wastes (**2**) according to claim 4, characterized in that the first series of separation orifices (**7**, **8**) also comprises secondary orifices (**8**) contributing to the separation of the mixture of wastes (**2**) into the first fraction of wastes (**13**) and into the residual second fraction of wastes (**14**) by passage of the first fraction of wastes (**13**) throughout said secondary orifices (**8**), the latter having a size adapted to allow the passage of wastes the size of which is comprised between 1 and 1.5 times the size of the wastes the passage of which is allowed by the primary orifices (**7**), the secondary orifices (**8**) being disposed upstream of the primary orifices (**7**), with regards to the flow direction of the mixture of wastes (**2**).

7. The machine (**1**) for sorting a mixture of wastes (**2**) according to claim 6, characterized in that the section of the secondary orifices (**8**) is circular, with a diameter comprised between 105 mm and 115 mm, preferably about 110 mm.

8. The machine (**1**) for sorting a mixture of wastes (**2**) according to claim 1, characterized in that the second series of separation orifices (**9**) comprises at least tertiary orifices (**9**) at least contributing to the separation of the residual second fraction of wastes (**14**) into the subfraction of small-sized wastes (**15**) and into the subfraction of large-sized wastes (**16**) by passage of the subfraction of small-sized wastes (**15**) throughout said tertiary orifices (**9**), the latter having a size adapted to prevent the passage of wastes with a size larger than at least 200 mm.

9. The sorting machine (**1**) according to claim 1, characterized in that the section of the tertiary orifices (**9**) is oblong-shaped, and said oblong section having a small diameter (Dp), and a large diameter (Dg).

10. The sorting machine (**1**) according to claim 9, characterized in that, for each tertiary orifice, the small diameter (Dp) is comprised between 200 and 240 mm, preferably about 220 mm, the large diameter (Dg) being comprised between 300 and 400 mm, preferably about 330 mm, the small diameter (Dp) being substantially perpendicular to the large diameter (Dg).

11. The sorting machine (**1**) according to claim 7, characterized in that the tertiary orifices (**9**) are distributed in successive rows along the second length (L**2**), by alternating at least:

a longitudinal row (**19**) of tertiary orifices (**9**), in which the large diameter (Dg) of the tertiary orifices (**9**) of the straight row is aligned in the direction of the second length (L**2**), and

a transverse row (**20**) of tertiary orifices (**9**), in which the small diameter (Dp) of the tertiary orifices (**9**) of the transverse row (**20**) is aligned in the direction of the second length (L**2**).

12. The sorting machine (**1**) according to claim 1, characterized in that the first series of separation orifices (**7**, **8**) is distributed substantially over the entire first length (L**1**) of the first trommel section (**3**), the second series of separation orifices (**9**) is distributed substantially over the entire second length (L**2**) of the second trommel section (**4**).

13. The sorting machine (**1**) according to claim 1, characterized in that the first series of separation orifices (**7**, **8**) is distributed over the entire circumference of the first separation wall (**5**), the second series of separation orifices (**9**) being distributed over the entire circumference of the second separation wall (**6**).

14. The sorting machine (**1**) according to claim 1, characterized in that the separation orifices (**7**, **8**) of the first series of separation orifices (**7**, **8**) are distributed over the first separation wall (**5**) according to a first random meshing, the separation orifices (**9**) of the second series of separation orifices (**9**) being distributed over the second separation wall (**6**) according to a second random meshing.

15. The sorting machine (**1**) according to claim 1, characterized in that each of the first trommel section (**3**) and the second trommel section (**4**) is designed to be rotated, the rotation is performed in an alternating manner in one direction and in the other according to a desired frequency.

16. The sorting machine (**1**) according to claim 1, characterized in that the first separation wall (**5**) and/or the second separation wall (**6**) is provided with vanes (**22**) for lifting the wastes circulating in the first trommel section (**3**) and/or in the second trommel section (**4**), respectively.

17. The sorting machine (**1**) according to claim 1, characterized in that the first trommel section (**3**) and the second trommel section (**4**) form a single trommel (**3**, **4**).

18. The sorting machine (**1**) according to claim 1, characterized in that the first trommel section (**3**) and the second trommel section (**4**) form two independent trommels, the sorting machine (**1**) including means for transferring the residual second fraction of wastes (**14**) from the first trommel section (**3**) to the second trommel section (**4**).

19. The sorting machine (**1**) according to claim 1, characterized in that at least 10%, preferably at least 20%, of the mass of the mixture is formed by biodegradable wastes, and at least 10%, preferably at least 20%, of the mass of the mixture is formed by non-biodegradable recyclable wastes (**26**).

20. A sorting method for sorting a mixture of wastes (**2**) with heterogeneous sizes, shapes and consistencies, comprising at least biodegradable wastes and non-biodegradable recyclable wastes, a non-negligible portion of the mass of the mixture of wastes being formed by biodegradable wastes, for example at least 10% of the mass, and a non-negligible portion of the mass of the mixture being formed by non-biodegradable recyclable wastes, for example at least 10% of the mass, said sorting method comprising the steps of:

introducing the mixture of wastes (**2**) in a first trommel section (**3**), provided with a first separation wall (**5**) extending over a first axial length (L**1**) and being provided with a first series of separation through orifices (**7**, **8**), wherein the first separation wall (**5**) has a first shape selected from the group consisting of a prism, a cylinder and a truncated cone, a height of the first shape defining a first longitudinal axis (X-X') of the first separation wall (**5**), the first separation wall (**5**) being rotated around the first longitudinal axis (X-X');

separating the mixture of wastes (**2**) into a first fraction of wastes (**13**) getting through said first separation wall (**5**) via the first series of separation orifices (**7**, **8**) and into a residual second fraction of wastes (**14**), the mixture of wastes (**2**) circulating along said first wall so as to be separated;

making the residual second fraction of wastes (**14**) pass from the first trommel section (**3**) to a second trommel section (**4**), provided with a second separation wall (**6**) extending over

a second axial length (L**2**) smaller than the first length (L**1**), said second separation wall (**6**) being provided with a second series of separation through orifices (**9**), wherein the second separation wall (**6**) has a second shape selected from the group consisting of a prism, a cylinder and a truncated cone, a height of the second shape defining a second longitudinal axis (Y-Y′) of the second separation wall (**6**), the second separation wall (**6**) being rotated around the second longitudinal axis (Y-Y′); and

separating the residual second fraction of wastes (**14**) into a subfraction of small-sized wastes (**15**) getting through said second separation wall (**6**) via said second series of separation orifices (**9**) and into a residual subfraction of large-sized wastes (**16**), the subfraction of large-sized wastes (**16**) being formed by wastes the size of which is larger than the subfraction of small-sized wastes (**15**), the residual second fraction of wastes (**14**) being intended to circulate along said second wall so as to be separated.

21. The method for sorting a mixture of wastes (**2**) according to claim 20 characterized in that the mixture of wastes (**2**) is introduced into a first trommel section (**3**) provided with a first separation wall (**5**) the first length (L**1**) of which is at least equal to 1.05 times, preferably at least 1.10 times, still more preferably at least 1.12 times the second length (L**2**) of the second trommel section (**4**) in which the residual second fraction of wastes (**14**) is passed.